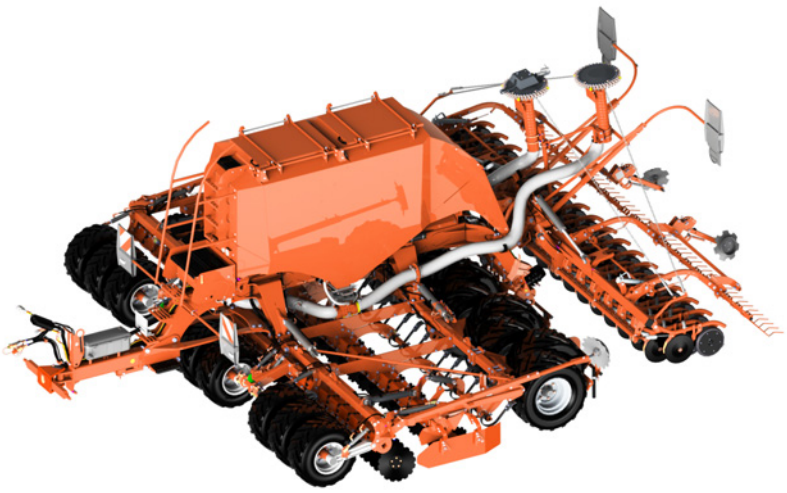


SC1601CF

Operator's manual

Edition	04.2019
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From machine number	→ Next page
Explanation	foldable
Reference number	A139761540

Machine identification

Operating manual valid from machine number	WK6SC1UD2KD#00122

In order for your dealer to assist you as efficiently as possible, you will need to provide some information about your machine.
Enter the details here.

Designation	SC1601CF
Working width	
Weight	
Machine number	
Accessories	
Address of dealer	
Address of manufacturer	Kverneland Group Soest GmbH Coesterweg 42 D-59494 Soest Germany Tel. +49 (0) 2921/974-0

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Table of Contents

Preliminary information 5
Target group 5
Safety 5
Instruction 5
Other applicable documents 5
Symbols 6

Safety 7
For your safety 7
Warning signs 7
Definitions 11
Who is allowed to operate the machine? 11
General safety information 11
Coupling 13
Hydraulics 14
Electrical 14
Calculation of axle loads 15
Permissible axle load of the machine 17
Road transport 19
Putting the machine into operation 20
Uncoupling 21
Care and maintenance 21
Further regulations 22
EU type approval 23

Familiarising yourself with the machine 24
Range of application 24
Features 25
Assemblies 26
Working zones 27
Technical specifications 28
Terminals 31
Software 31

Delivery and assembly 32
Scope of delivery 32

Attaching the machine 33
Coupling 33
Connecting 34

Hydraulic system 35
Familiarising yourself with the hydraulic system 36
Working with the hydraulics 39
Hydraulic fan drive 41
Operation 43

Brake system 44
Air pressure brake system 44
Hydraulic brake system 48

Work preparations for soil preparation .. 50
Folding out 51
Tools for the soil preparation 52

Preparation for sowing 57
Hopper for seed and fertiliser 58
Track marker 60
Seed coulters with fertiliser supply 62
S-tine harrow or finger-tine harrow [+] 63
Pre-emergence marker [+] 65
Shut-off valves [+] 67
Hopper low level sensor [+] 68
Level indicator [+] 69
Weighing system [+] 71
Filling with seed 75
Metering device 79
Electronic scales 90

Driving on the road 92
Safety 92
Transport position 96
Road transport 101

Preparations in the field 103
Folding out 103
Seed hopper 104
Setting Work 110
Checks 113
Test drive 114

Operation 116
Checks during sowing 120
After sowing 121

Cleaning and care 124
Cleaning 124
Care 128

Parking and storage 129
Implements 129
Parking and securing the machine 129
Storing the machine 133

Maintenance 134
For your safety 134
General information 135
Securing the machine 137
Maintenance intervals and setting work 138
Lubricating the bearings 143
Bolted connections to the tractor 149
Front wheel packer [+] 150
Track eradicator [+] 150
Disc harrow 151
Rear wheel packer 152
Levelling bar [+] 157
CD mulch seed coulter 158
Seed-covering harrow 161
Metering device 162
Hydraulic hoses 166
Sensors 167
Brake system 168

Table of Contents

Eliminating faults 173
Terminal 173
Speed sensor 174
Other 175
Hydraulics 176
Seeding technology 177

Circuit diagrams 179
Lighting circuit diagram 179
Circuit diagram for the standard hydraulics 180
Circuit diagram for the LS hydraulics 181
Air pressure brake system circuit diagram 182

Disposal 183

EC Conformity Declaration 184

Index 185

Target group

This operating manual is intended for trained farmers and individuals who are otherwise qualified to perform agricultural activities and who have received instruction in the operation of this machine.

Safety

Study the contents of this operating manual carefully, which are relevant for your activity, before initial operation or assembly of the machine. Always read through the safety instructions in the chapter “Safety” and observe the warning information in the individual chapters. In this way, you will achieve optimum work results and operational safety.

For the employer

Provide instruction in these safety instructions for personnel working with the machine on a regular basis and provide information on statutory regulations. Untrained or unauthorised persons are not permitted to use the machine.

The following are included in this training:

- Checking that staff possess the necessary requirements for safely handling the machine
- Handing out the operating manual and the other relevant and applicable documents or an intensive course of training which, in particular, includes the safe handling of the machine

Regular instruction sessions

Instruct your staff regularly, but at least once a year, concerning the basic procedural measures for safely handling the machine.

Instruction

You will receive training from your dealer concerning using the controls, safe operation and care of the machine. Initial operation without first receiving training is not permitted.

Other applicable documents

In addition to the operating manual, other documents also form an integral part of the machine:

EC Conformity Declaration	Integral part of this operating manual → Chapter »EC Conformity Declaration«, page 184
Spare part manual	Integral part of the delivery with this machine
Operating manual of the weighing system manufacturer [+]	Integral part of the delivery with this machine
Operating manual for the electronic control system	E-COM u-drill software
Operating manual for the terminal [+]	For example, IsoMatch Tellus

Symbols

In order to make this manual clear and easy to read, we have used various symbols. They are explained below:

- A bullet point accompanies each item in a list

▸ A triangle indicates operating functions which must be performed

→ An arrow indicates cross-references to other text passages

[+] A plus sign indicates an accessory that is not included in the standard version.

Pictograms

We have also used pictograms to help you find instructions more quickly:



The warning triangle indicates warning information. Failure to observe these safety instructions can result in:

- Moderate to serious injury
- Fatal injury

You will find the warning information associated with individual operations, where it is important to observe the warning information before these operations are carried out.
In the »Safety« chapter, you will also find safety instructions which are not related to individual operations, but rather are designed to encourage safety-conscious behaviour in various situations.



This sign indicates important instructions regarding the machine. Failure to observe these safety instructions can result in:

- Serious faults in the correct operation of the machine
- Damage to the machine



This symbol indicates information, tips and notes on operation.



This symbol indicates tips for assembly or adjustment work.



This symbol indicates examples that assist a better understanding of the instructions.

Parts in the text which refer to individual machines or to conditions have a coloured background. After the coloured section, the text then again applies to all conditions and machines. For example:

Before folding out only

▸ Release the locking mechanism for transport.

▸ Actuate control unit.

For your safety

This chapter contains general safety instructions. Each chapter of the operating manual contains additional specific safety instructions, which are not described here. Observe the safety instructions:

- In the interest of your own safety
- In the interest of the safety of others
- To ensure the safety of the machine

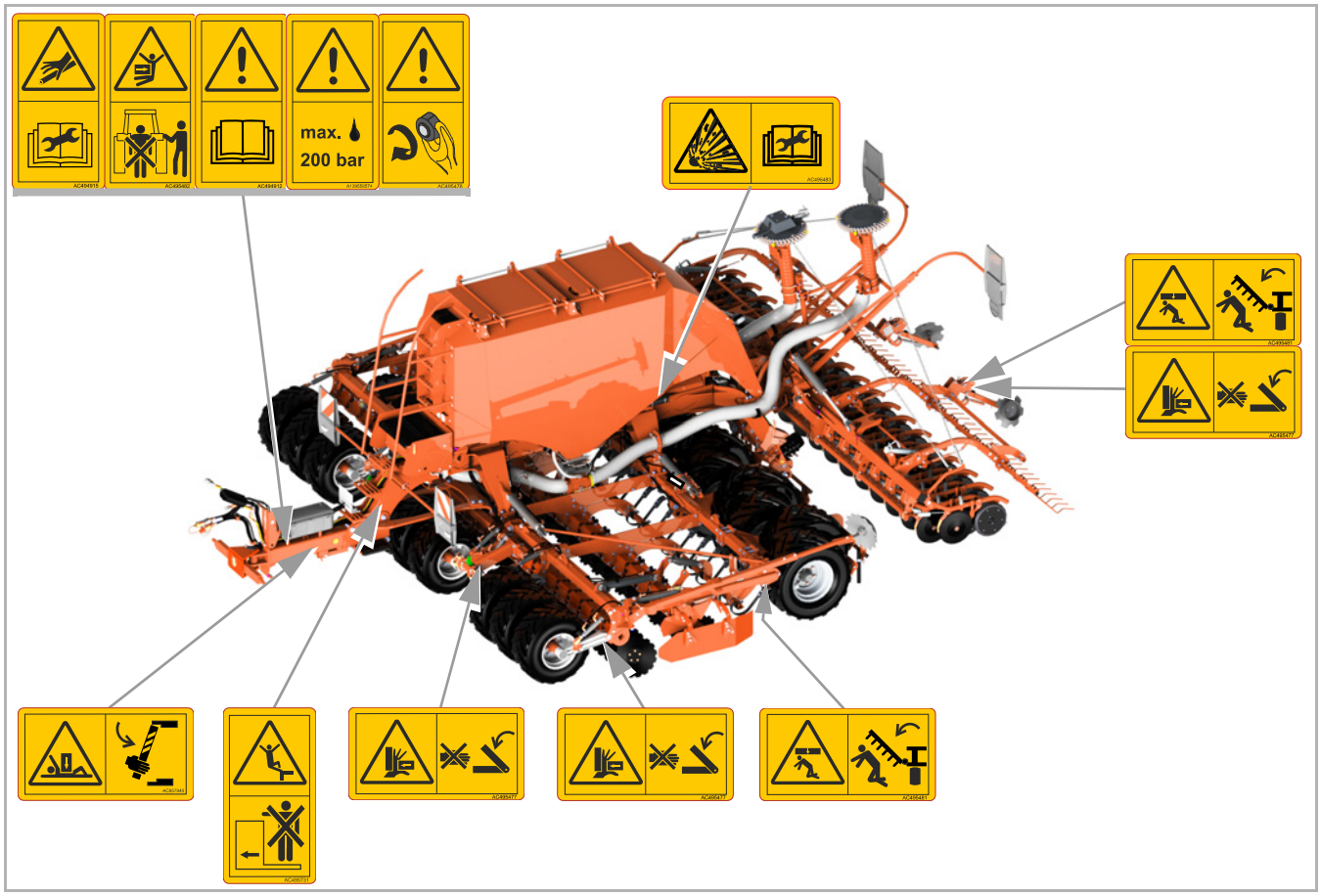
Numerous risks can result from handling agricultural machinery in the wrong way. Therefore, always work with particular care and never under time pressure.

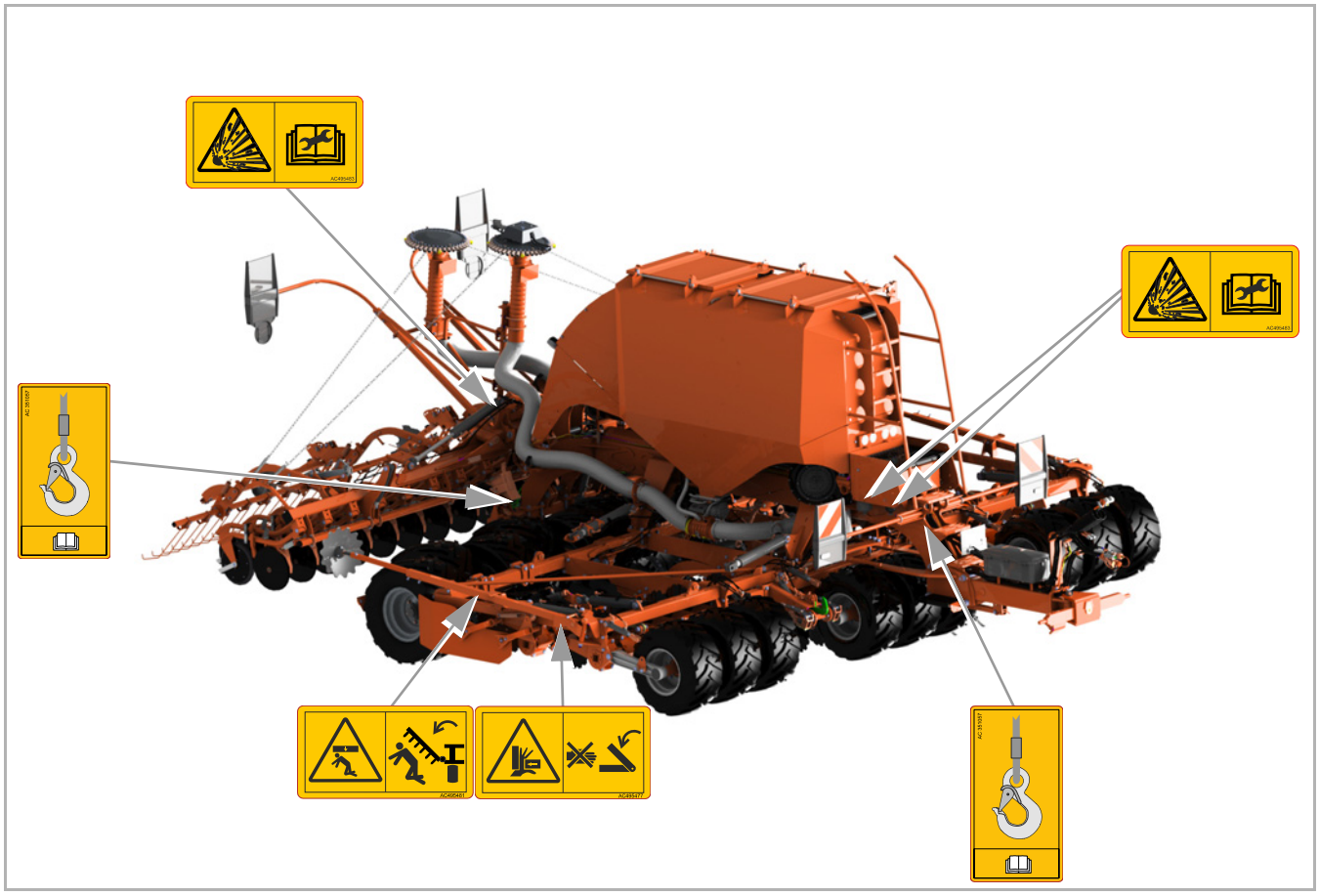
For the employer

Regularly provide the following information to all persons who work with the machine: The safety instructions and the statutory regulations.

Warning signs

On the machine you will find stickers that serve to ensure your safety. The labels must not be removed. If stickers become illegible or begin to peel off, order new stickers and attach these in the appropriate places.
Hazard areas, which are located on both sides of the machine, are marked with a warning sign only on one side of the machine in the images, as an example.


max.
200 bar



Meaning



Read the operating manual carefully and follow the instructions
Initial operation of the machine must not take place before the operating manual has been read and understood. This particularly applies to safety instructions.



Do not stand between the tractor and the machine
Standing between the tractor and the machine with the engine running is prohibited, especially during coupling and uncoupling. The tractor must be additionally immobilised.



Riding on the machine is strictly prohibited
Never transport persons or objects on the machine. Riding on the machine is life-threatening and strictly prohibited.



Caution in the event of leaking hydraulic fluid
Observe the corresponding safety instructions in the operating manual.



Lifting eye
Only lift the machine at the marked positions and using lifting devices or secure it to a transporter.



Do not exceed the maximum hydraulic pressure
The hydraulic pressure on the tractor must not exceed 200 bar. Exceeding the 200 bar limit could damage the machine.



Tightening screws
After the first hours of operation, all bolts must be checked and any loose bolts must be tightened. Screw connections might have come loose due to vibration.



Stay clear of the slewing range
There is an acute risk of injury within the slewing range from machine parts which are slewing or folding.



Risk of crushing
Avoid hazard area. The space between components may become smaller or disappear completely.



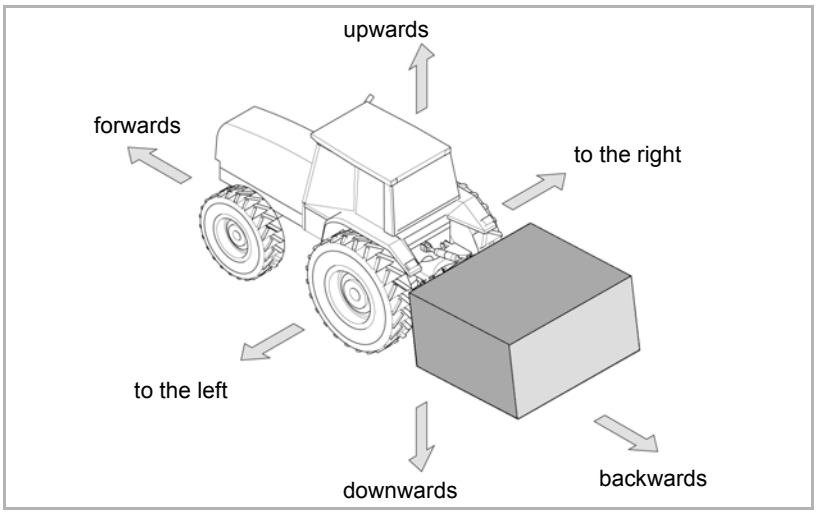
Risk of tipping
The machine or parts can tip over. Before entering the hazard area, attach supporting legs. To uncouple, use the supports provided and position the machine on firm ground.



Risk of explosion
The pressure accumulator contains pressurised gas and oil. Disassembly and repair work must only be carried out by qualified specialists.

Definitions

For all direction information, the direction of travel is the starting direction:



Who is allowed to operate the machine?

Only qualified personnel
Only qualified persons who have been informed of the dangers associated with handling the machine are permitted to operate, service or repair the machine. As a rule, such persons are trained and experienced in agricultural work or have been thoroughly trained in a similar activity.

General safety information

The general safety information and warning signs apply to every phase of the life cycle of the machine and to every application.

Training required before initial operation
The machine may only be put into operation if thorough training has been carried out by an authorised dealer or by an employee of the manufacturer. Operation without proper training can lead to damage to the machine due to incorrect operation, or may cause accidents.

Safety is your responsibility
Follow the safety regulations. Ensure that all operators comply with the safety instructions. Prevent serious or fatal accidents by following the safety instructions.

Instructions in the event of malfunctions
In the event of a malfunction

- Shut down,
- Stop and secure the machine immediately.
- Immediately rectify the faults, if you are qualified to do so, or
- Commission an authorised dealer.

Operating a faulty machine can cause accidents or damage.

No persons in the working area
Ensure that no persons – children in particular – are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. Accidents with serious or fatal injuries may be caused as a result.

Safety for children
Never assume that children will remain where you last saw them. Be alert and shut down the machine if children are in the working area of the machine. Prohibit children from playing on or around the machine and from operating the machine.

Perfect working condition
Ensure that the tractor and the machine are always in perfect working condition. Make sure that the tractor brakes work in conjunction with the machine. Also follow the instructions in your tractor's operator's manual.

Specified workwear
Do not wear baggy, loose-fitting or other unsuitable clothing. Loose fitting items of clothing may become caught in rotating parts. Wear workwear and protective clothing which is suitable for the working environment and the operating conditions. Wear workwear and protective clothing, as specified by the Accident Prevention and Insurance Association. Serious or fatal injury may be caused as a result.

No riding on the machine
Persons or objects must never be transported on the machine. Carrying passengers – particularly children – on the machine is life-threatening and prohibited. Serious or fatal injury may be caused as a result.

Safety distance from raised and unsecured loads
Never work under suspended loads. Maintain a sufficient distance from raised and unsecured loads. Serious or fatal injury may be caused as a result.

Unrestricted field of vision to the rear
After it has been coupled, ensure that you have an unrestricted view of the machine, in both its work and transport positions. Dangerous situations may not be detected in good time. Accidents or damage may be caused as a result.

Make sure the machine is standing level
Before changing from the transport to the work position (and vice versa), make sure the machine is standing level. The machine could tip over, particularly on hillside locations. Otherwise, damage to the machine and serious or fatal injury may be caused as a result.

Never work on the machine while it is running
No operations may be performed on the machine while it is running. Objects or persons can be caught, drawn in or crushed. Serious or fatal injury may be caused as a result.

Do not make any modifications to the machine
No modifications of any kind may be made to the machine. Unauthorised modifications can adversely affect the correct operation and safety of the machine and shorten its service life. Unauthorised modifications to the machine render the manufacturer's guarantee null and void and free the manufacturer from all liability.

Switch off the tractor PTO shaft drive
Switch off the tractor's PTO shaft drive, especially if people could enter the working area of the machine when you

- raise the machine,
- Switch from the work position to the transport position (and vice versa)
- reverse the vehicle in the work position

Rotating, unprotected parts can damage the machine and cause life-threatening injuries.

Coupling

Increased risk of injury
Coupling the machine to the tractor creates an increased risk of injury:

- Secure the tractor against rolling away
- The tractor and machine categories must be the same
- Never stand between the tractor and the machine during coupling
- Actuate the three-point power lift system slowly and carefully

Failure to observe these instructions may result in serious or fatal injuries.

Only use the PTO shaft specified
Use only the PTO shafts specified by the manufacturer and read the attached operator's manual carefully. Adjust the length of the PTO shaft as required. Incorrect PTO shaft lengths can cause damage to the machine and personal injury.

Check and fasten the PTO shaft guard in position
The rotating PTO shaft is protected by the PTO shaft guard. Ensure that the guard is not damaged. Secure the PTO shaft guard by hooking the chains onto the tractor. On the machine side, unguarded PTO shafts can cause life-threatening injuries.

Observe the PTO shaft manufacturer's operating manual
The PTO shaft manufacturer's operating manual provides instructions on correct handling of the PTO shaft. Failure to observe these instructions can result in damage to the PTO shaft and the machine.

Hydraulics

Only connect the hydraulics when depressurised
Only connect the hydraulic hoses to the tractor hydraulic system if the tractor and machine hydraulic system is depressurised. A hydraulic system under pressure can trigger unpredictable movements of the machine.

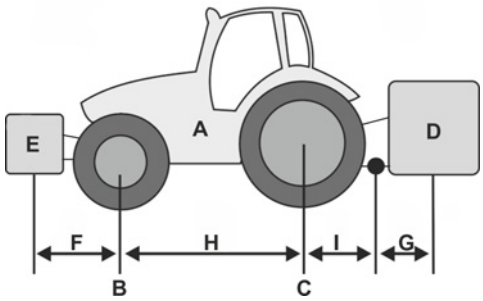
High pressures in the hydraulic system
The hydraulic system is under high pressure. Regularly check all pipes, hoses and screw-on connections for leaks and externally visible damage. Use suitable tools only when looking for leaks. Eliminate damage immediately. Oil escaping under pressure may result in injuries and fires. In the event of injuries, seek medical attention immediately.

Colour-coded hydraulic hoses
To prevent false operation, the hydraulic connections between the tractor and machine are colour-coded. Incorrectly connected hydraulic hoses can trigger unpredictable machine movements.

Electrical

Connect electrical supply only after mounting the equipment
Only fit the lighting equipment when the power supply to the tractor has been switched off. Short-circuits and damage to the electronics are possible.

Calculation of axle loads



Observe the total weight, axle loads, tyre load-bearing capacity and minimum ballast specifications.
The machine's front or rear attachment must not exceed the tractor's permissible total weight, its permissible axle load or its tyre load-bearing capacity. To guarantee the steering capability, the front axle must bear at least 20% of the tractor's empty weight.

You calculate:

- Total weight
- Axle loads
- Minimum ballast

For this calculation, the following data is required:

From the tractor's operating manual:

- **(**A) Empty weight
- (B) Front axle load
- (C) Rear axle load
- (H) The tractor's wheel base.

Take additional weights into consideration, for example, the weight of water in the tyres and accessories.

From the documentation from the tyre manufacturer

- Tyre load-bearing capacity

From the operating manual

- (D) Total weight of the machine when rear-mounted; the supporting load with the machine hitched
- (E) Total weight of the machine when front-mounted
- (G) Distance between the lower link ball midpoint and the machine's centre of gravity when rear-mounted. With machines attached, G=0.

Measurements

- (F) Distance between the machine's centre of gravity when front-mounted and the front-axle midpoint
- (I) Distance between the centre of the rear axle and the centre of the lower link ball – for attached machines, up to the centre of the yoke or ball

Calculation

You can calculate the values using the formulas.

Ballast with front weights

Ballast with front weights on rear-mounted machines:

$$\text{Front ballast in kg} = \frac{D \times (I + G) - (B \times H) + (0,2 \times A \times H)}{F + H}$$

Ballast with rear weights

Ballast with rear weights on front-mounted machines:

$$\text{Rear ballast in kg} = \frac{(E \times F) - (C \times H) + (0,45 \times A \times H)}{H + I + G}$$

Front axle load

Actual front axle load (J) in kg

$$J = \frac{E \times (F + H) + (B \times H) - D \times (I + G)}{H}$$

Total weight

Actual total weight (K) in kg

$$K = E + A + D$$

Rear axle load

Calculating the actual rear axle load (L) in kg

$$L = K - J$$

Summary

The following conditions must be fulfilled:

- The actual rear axle load must be less than the permissible rear axle load given in the tractor's operating manual.
- The actual total weight must be less than the permissible total weight given in the tractor's operating manual.
- The actual front axle load must not exceed the total permissible tyre load-bearing capacity of the front wheels.
- The actual rear axle load must not exceed the total permissible tyre load-bearing capacity of the rear wheels.

If one or more of these conditions is not met, the machine must not be attached to the tractor or used in on public roads.



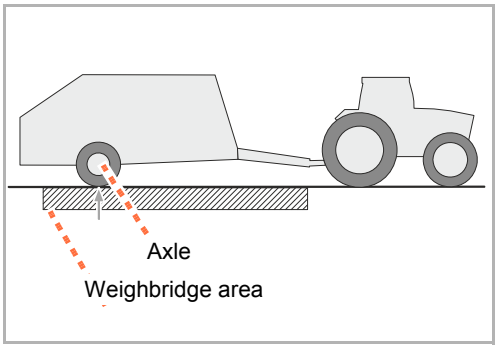
You can determine the total weight, front axle load and rear axle load on a weighbridge.

Permissible axle load of the machine

Comply with permissible axle loads
Road transport must only take place up to the maximum permissible axle load of the machine.
A filled seed hopper or fertiliser hopper influences the driving performance of the machine if overloaded and can cause accidents during road transport.
→ Maximum permissible weights: Chapter »Familiarising yourself with the machine«, section »Technical specifications«, page 28

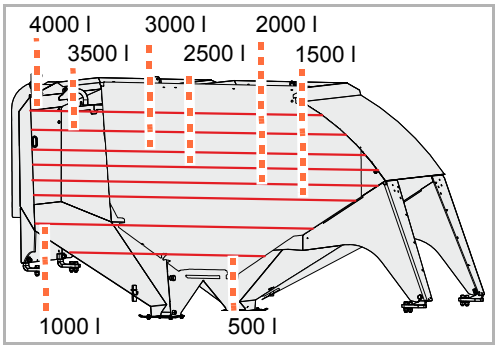
The difference between the permissible axle load and the actual axle load when in an unloaded state results in the possible load.

Load in the hopper



- Fold the unloaded machine into its transport position.
- Position the machine with all axles on a weighbridge. The tractor's axles are not on the weighbridge.
- Enter the weighing result in the "Axle load when unloaded" line in the table.

	Specification	Example	Calculation
Permissible axle load [kg]	Value from technical data	8800	8800 [kg]
Axle load when unloaded [kg]	Weighing result	- 7300	- [kg]
Possible load in the hopper [kg]	Calculation	1500	[kg]
Machine-specific factor	1.37	x 1.37	x 1.37
Possible load in the hopper [l]	Calculation	2055	[l]



The lines in the image represent each of the filling quantity limits. Each filling quantity limit is reached when the entire hopper is full up to this line.

- Only fill seed and fertiliser up to the previously calculated value.

If you change the equipment on the machine, you have to recalculate the possible load.

To check the result, weigh the machine with the load poured in.

Road transport

Ensure that the condition of the machine conforms to traffic regulations
The machine must conform to current road traffic regulations if you intend to drive with it on public roads. This includes, for example:

- Lighting, warning and protective devices must be fitted
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- The machine must only be towed by agricultural or forestry tractors. The empty weight of the tractor must be greater than the weight of the machine.

The driver and keeper of the vehicle are liable should the road traffic regulations not be observed.

Close the ball valves
If there are ball valves on the hydraulic lines or chassis cylinders, the ball valves must be closed for driving on the road. Otherwise, accidental actuation of control units in the tractor could trigger machine movements. Accidents with serious or fatal injuries or damage to the machine may be caused as a result.

Checking the tyre pressures
Check the tyre pressures on a regular basis. If the tyre pressure is too high or too low, this can reduce the service life of the tyre and result in undesirable work results and can result in accidents when travelling on roads.

Check hitch pins
Hitch pins must be in perfect condition. Hitch pins must show no signs of wear and be properly secured. Otherwise, hitched machines may detach themselves of their own accord. Accidents with serious or fatal injuries may be caused as a result.

Check trip ropes for the quick release coupling
Release ropes must hang loose and must not allow a release in their lowered position. Coupled machines could otherwise be released of their own accord from the three-point linkage.

Take altered driving and braking performance into account
Driving and braking performance are altered when the machine is attached to the tractor. Take the width and balancing weight of the machine into consideration, especially when cornering. A driving style not adapted to conditions can cause accidents.

Adapted driving speed
Always adapt the driving speed to the ambient conditions. Driving too fast, for example on uneven terrain, can result in damage to the machine and cause accidents.

Putting the machine into operation

Ensure that the machine is in perfect working condition
Do not operate the machine unless it is in perfect working condition. Check all important components and replace any defective components before starting the machine. Defective components can cause damage to equipment and personal injuries.

Do not remove the protective devices
The protective equipment must not be removed or by-passed. Check all protective devices before starting the machine. Unprotected machine parts can cause serious or fatal injury.

Height of machine and overhead power lines
If a height of 4.00 m is exceeded when folding the machine in and out, the machine must not be folded in the vicinity of conducting overhead power lines! Danger of electrocution! Should the machine come into contact with a live overhead power line:

- Do not attempt to exit the tractor cabin
- Do not touch any metal parts on the tractor
- Ensure that there is no conductive contact with the ground
- Warn all persons in the area not to approach the tractor or the machine
- Wait for help from professional emergency service personnel as power in the overhead line must first be switched off

Never climb onto the machine beneath live overhead power lines. Electrocution does not require direct contact.

Working during a storm
Never work on the machine outdoors during a storm. This poses the risk of being struck by lightning.

Check the immediate vicinity
Before driving off, folding out, and operating the machine, check its immediate vicinity. Ensure sufficient visibility. Do not begin work until the immediate vicinity is cleared of any persons or objects. Any use of the machine without first checking the surrounding area can cause accidents.

Retighten all nuts, bolts and screws
Nuts and bolts should be checked for firm seating after the first hours of operation and at regular intervals thereafter and tightened if necessary. bolts can come loose unnoticed while operating. This can result in damage to the machine or accidents.

The PTO shaft continues turning after it has been switched off
After the PTO stub shaft drive on the tractor has been switched off, the machine continues to run due to the moment of inertia. Maintain a sufficient safety distance until all moving parts have come to a complete standstill. Otherwise, damage to the machine and serious or fatal injury may be caused as a result.

Cornering and turning manoeuvres
Centrifugal forces are active during cornering. The machine's centre of gravity at the rear of the tractor is displaced. Be aware of the turning radius and the moment of inertia. A driving style which is not adapted to conditions can cause accidents. Accidents with serious or fatal injuries may be caused as a result.

Uncoupling

Increased risk of injury
Uncoupling the machine creates an increased risk of injury. Therefore:

- Secure the tractor against rolling away
- Never stand between the tractor and the machine during uncoupling.
- Actuate the three-point power lift system slowly and carefully
- Make sure the machine is standing on a secure and level surface
- Place the PTO shaft in the holder provided
- Secure the machine against rolling away (use wheel chocks)
- Ensure that the sustainers provided are securely locked
- Only uncouple the hydraulic hoses if the tractor and machine hydraulic system is depressurised
- Disconnect the electrical connections

Failure to observe these instructions may result in serious or fatal injuries.

Care and maintenance

Observe the care and maintenance intervals
Observe the prescribed intervals for maintenance checks and inspections specified in the operating manual. Failure to observe the time periods can result in damage to the machine, poor work quality and accidents.

Replacement parts and accessories
Only use original parts or parts that meet the manufacturer's requirements. In case of doubt, confirm the suitability of the parts with the dealer or manufacturer. Using unsuitable replacement parts and accessories compromises the safety of the machine. Damage to the machine and serious accidents may occur.

When performing all care and maintenance work:

- Switch off the PTO
- Take the pressure from the hydraulic system
- Ensure that the machine is standing securely. Provide additional support as required
- Whenever possible, uncouple the tractor
- Do not use parts of the machine as climbing aids; use only proper safety climbing aids
- Secure the machine against rolling away
- Do not reach into drives when they are running

It is only possible to guarantee safety during care or maintenance work if these regulations are observed.

Turn off the electrical supply
Prior to carrying out work on the electrical system, disconnect the system from the power supply. Systems being supplied with electrical power can cause damage to equipment and personal injury.

Replacing hydraulic hoses
Replace hydraulic hoses every six years. Hydraulic hoses can age without any externally visible signs. Defective hydraulic lines can cause serious or fatal injuries.

Before carrying out welding work, disconnect the battery and generator
Before carrying out electrical welding work on the attached machine, disconnect the tractor's battery and dynamo. This prevents damage to the electrical system.

Tighten screw connections firmly
Retighten screw connections that have been loosened during care and maintenance work. If screwed connections are loose, machine parts may become detached. Serious injury or damage to equipment can result.

Further regulations

Observe the regulations
In addition to the safety instructions listed above, observe the following:

- Regional and national accident prevention regulations
- Generally recognised safety regulations, occupational health and road traffic requirements and national road traffic regulations
- Information in this operating manual
- Regulations relating to operation, maintenance and repair

EU type approval

An EU type approval in line with EU Regulation 167/2013 for vehicle class "S" is available for this machine.

The EU Certificate of Conformity is included in the scope of delivery as evidence of the EU type approval. Present the EU Certificate of Conformity to the licensing authorities to obtain the type approval.

Some machines of this type do not comply with all of the requirements of the EU type approval and do not receive any EU Certificate of Conformity.
These machines must only be used for transport on public roads only following a national type test.

Invalidation of the type approval

If a trailed machine with EU type approval is modified to such an extent that it is no longer in the condition it was delivered in or it no longer meets EU Certificate of Conformity specifications, the type approval is invalidated.
The customer or the dealer must present the machine to the Technical Services department without delay so that the modifications can be entered in the national approval documents.

This chapter contains general information on your implement and information on:

- Range of application
- Definitions
- Proper use
- Features
- Component designations
- Technical specifications

Range of application

The machine is designed for soil preparation and seeding in one step or for mulch seeding, after ploughing. Flexible equipment options and exchangeable tools in five functional zones make it suitable for different kind of soils. The prerequisite is always a soil condition that allows cultivation and seeding. With some soil types, wetness or drought, for example, can make cultivation or seeding impossible.

Definitions

There are different interpretations and definitions for some agronomic terms. The terms used in this operating manual are defined as follows.

Seeding after ploughing

Seeding after completion of turning the soil with the plough.

Mulch seeding

Seeding after mixing the soil. The soil must be worked deeper than the required deposit depth.

Direct seeding

Seeding without any soil preparation. Residue from the previous crop is chaffed or in a condition which allows direct seeding.

Proper use

Any application other than or beyond this, e.g. as a means of transport, for stump pulling, or to transfer power to other objects is considered improper use. The manufacturer and dealers are not liable for damage caused by improper use. The risk is borne solely by the user.

Features

Perfected design
Specially hardened materials combined with an optimised construction, a flexible modular design, and a favourable centre of gravity all make this efficient and precision machine a reliable and sturdy device. The extensive tool equipment enables the preparation of the seedbed in one step and the seeding with an electronically controlled seeding machine.
In addition, the favourable centre of gravity of the machine assures an excellent re-compaction. As the soil preparation is accomplished only with trailed soil working tools, the energy consumption is low.

Exact depth adjustment and control
All soil preparation tools can be set in regard of the working depth. Large-scale wheel packer rollers allow for exact depth control.

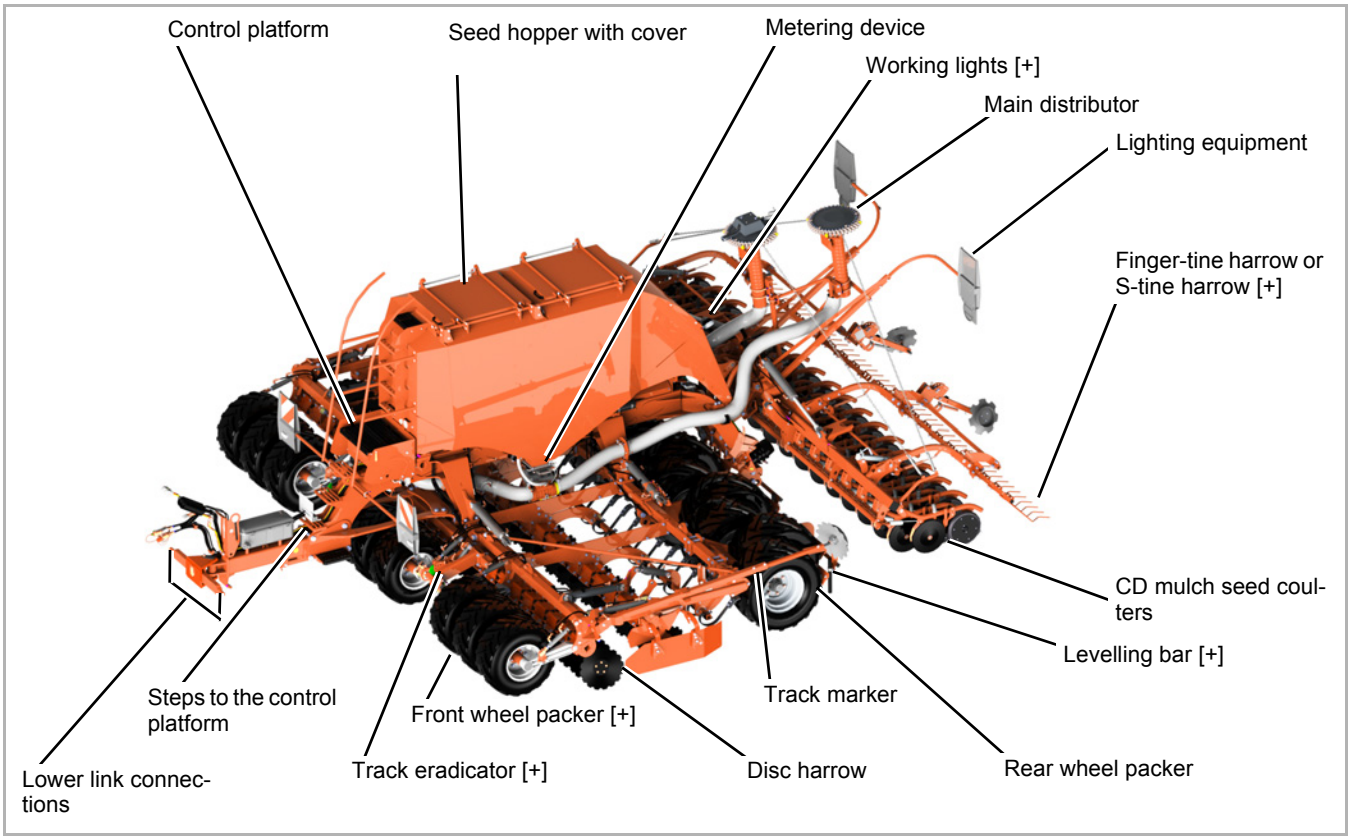
Packer
There are wheel packers for crumbling and re-compacting the seedbed.

Coulters
The CD mulch seed coulter is adapted to the particular features of the machine. Thus, at multiple soil conditions, higher drive speeds than with other seed coulters are possible.

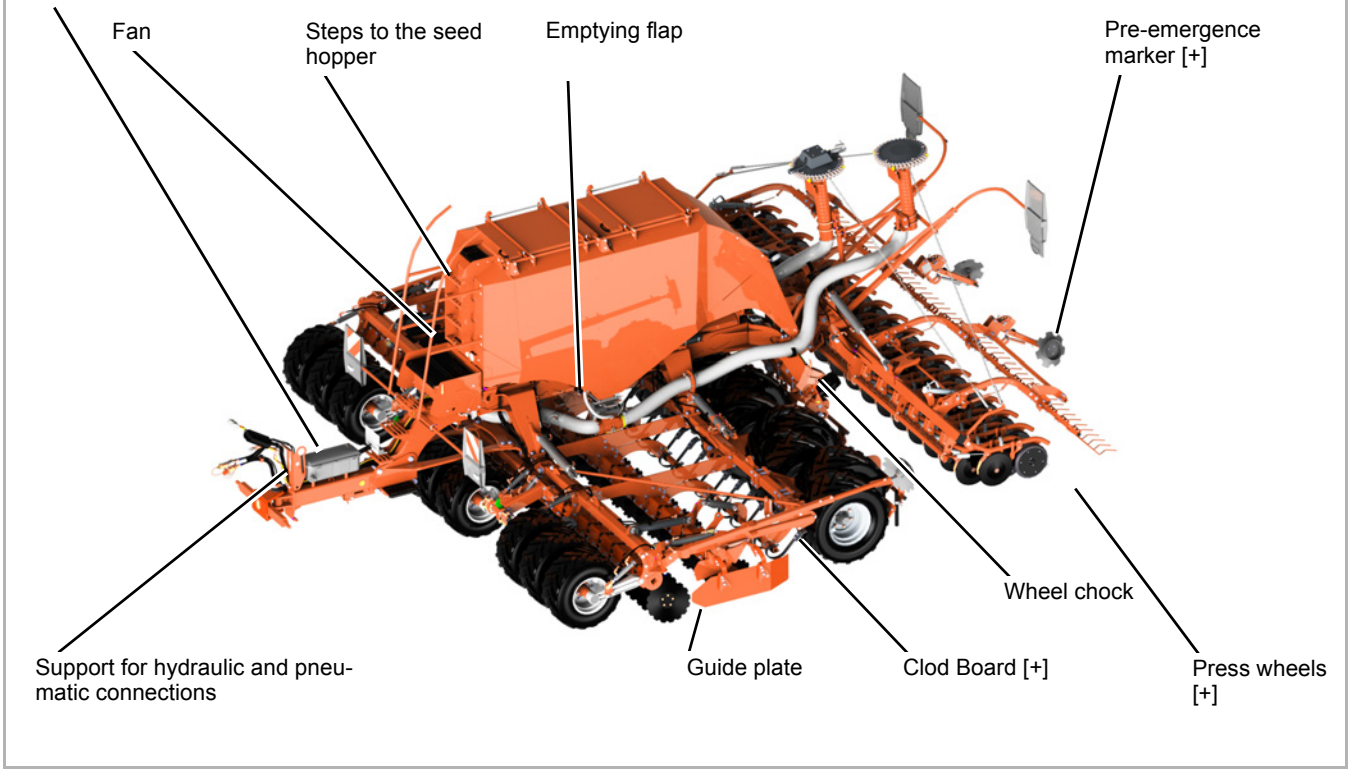
Brake system [+]
Depending on national regulations, the machine contains either an air pressure brake system or a hydraulic brake.

Safety
The machine is constructed in accordance with EU regulations, for maximum possible safety of operation. The machine bears the CE mark.

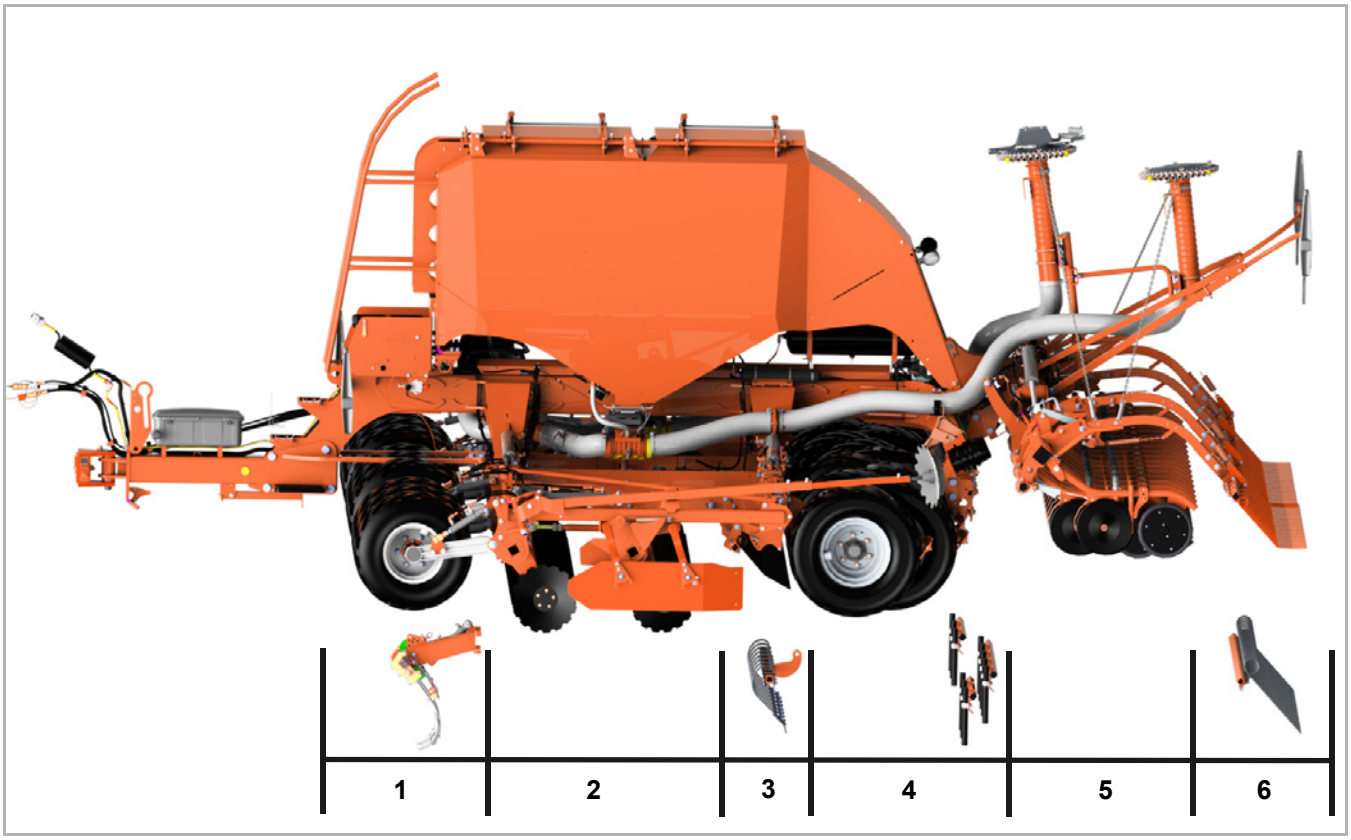
Assemblies



Calibration tray, tool case, seed chute, tools, scales, collecting bag, spare parts list and operating manual are supplied with the seed hopper



Working zones



Zone	Function	Tool
1	Levelling	• Front wheel packer [+] • Track eradicator [+]
2	Cultivating and loosening	• Disc harrow • Fertiliser deposition [+]
3	Crumbling	• Clod Board [+] • Intermediate harrow [+]
4	Re-compacting	• Rear wheel packer • Levelling bar [+]
5	Seeding and pressing	• CD mulch seed coulter • Press wheels [+] • Fertiliser deposition [+]
6	Covering	• S-tine harrow [+] • Finger-tine harrow [+]

Technical specifications

General

Working width	6.00 m
Coulters	
Quantity	36 / 48
Row spacing [cm]	16.7 / 12.5
Height [m]	
Work position	3.30
Transport position	3.95
Width [m]	
Work position	6.38
Transport position	2.99
Depth [m]	
Work position	8.58
Transport position	8.48
Total weight [kg]	
Without accessories	7300
With accessories	8900
Maximum permissible weights [kg]	
For road transport	
Supporting load	2500
Axle load	8800
Total weight	11300
On the field	
Axle load (borne on all wheels of the wheel packer)	11000
Tyre pressure [bar]	
Front wheel packer (31.5-15.5-15)	2.0
Rear wheel packer (420/55-17)	2.0
Tightening torque of the wheel nuts [Nm]	
Front wheel packer (31.5-15.5-15)	350
Rear wheel packer (420/55-17)	350

Working width	6.00 m
Maximum permissible speed on public roads [km/h]	
With European type approval while observing the maximum permissible axle load	40
With a national exemption while observing the maximum permissible axle load	25
Hopper	
Fill level [m]	2.97
Total hopper volume [l]	4300
Hopper volume division [%]	60:40
Hopper filling for a 60:40 division, maximum of approximately [kg fertiliser] maximum of approximately [kg wheat]	 2580 1350

Others

Working width	6.00 m
Tractor	
Tractive effort, minimum [kW]	120
Tractor lower link arms	Cat 3, Cat 3N, Cat 4N (ISO 730)
Minimum conveying capacity of the hydraulic pump [l/min]	90
Hydraulics	
Maximum permitted operating pressure [bar]	200
Control valves, base machinery with hydraulic fan drive	
Single-acting	0
Double-acting	1
Pressureless return line, maximum 10 bar	1
Hydraulic fan drive	
Oil flow [l/min] at 5000 rpm	55
Operating pressure [bar]	120

Working width	6.00 m
Electronic control system and electrohydraulics	
Power supply [V]	12
Fuse [A]	30
Protection class	IP 65
Terminal	
→ Operating manual for the terminal	
E-COM	
Power supply [V]	12
Main fuse [A]	60
Secondary fuse [A]	25
Power consumption of various electrical consumers	
Metering device [W/unit]	180
Tramline control system [W/unit]	20
Half-width shut-off [W/unit]	20
Electrically actuated hydraulic valve controls [W/unit]	25
Working lights with LEDs [W/pc]	18
Noise level [dBA]	
Fan at 4200 rpm Driven by electric motor. Maximum value, measured on the enveloping curve. The noise level may change due to the tractor.	98

Terminals

To display the electronic control system, ISOBUS-compatible terminals are used or terminals that have been specially developed for displaying the data.

IsoMatch Tellus GO

ISOBUS-compatible terminal with colour display for the software
→ “IsoMatch Tellus GO” operating manual



IsoMatch Tellus

ISOBUS-compatible terminal with colour display for the software
→ “IsoMatch Tellus” operating manual



External terminals

Other ISOBUS-compatible terminals can also be used for machines with the software.
→ Operating manual for individual manufacturers

Software

All functions of the software are described in a separate operating manual.
→ Operating manual for the software, section »Other applicable documents«, page 5

Scope of delivery

Soil preparation and seeding technology
The machine is supplied completely assembled for the areas of soil preparation and seeding. If parts of the machine have not been fitted, contact your dealer.



Do not assemble the machine yourself
Do not do assembly work yourself because prerequisites for an orderly condition of the machine are :

- The observance of a sequence of workshops
- Compliance with tolerances and torques
- Safe handling of the electronics

Assembling the unit without specialist knowledge may lead to damage to the machine or to poor work results.

Electronic control system
An electronic control system is provided as an accessory, for example, to create tramlines. Your dealer will perform the final assembly on your tractor.



If parts are missing or have been damaged during transportation, submit a claim immediately to your dealer, importer or the manufacturer.

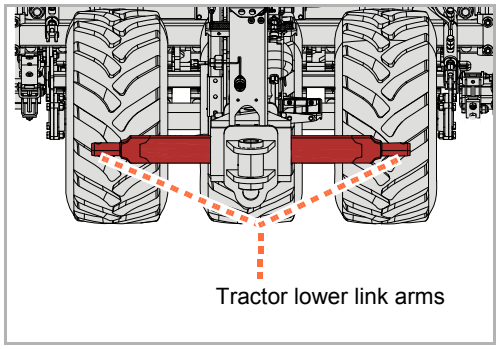
Coupling

Increased risk of injury
Coupling the machine to the tractor creates an increased risk of injury.

- Check the tractor and machine categories. The categories must match.
- Secure the tractor against rolling away
- Never stand between the tractor and the machine during coupling
- Actuate the three-point power lift system slowly and carefully

Failure to observe these instructions may result in severe or fatal accidents.

Lower link



- Slide suitable lower link balls onto the tractor lower link arms and secure with linchpins.
- Set both lower link balls on the tractor to the same height.

Make sure the lower links lock into place
Both lower links must engage. If they do not, the machine may detach itself from the lower links.
This could result in damage to the machine or tractor, or personal injury.

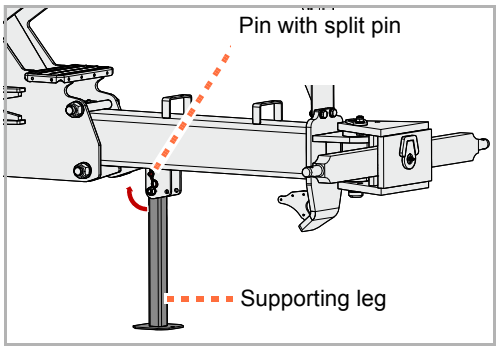
- Couple the machine with the tractor. Ensure that the lower link engages.
- Lift the machine slightly above the lower link ball.
- Set the lower link ball so that the machine has little play to the left or right.

Tractors with articulated steering or a crawler chassis

- Set the lower link balls for working in the field so that the machine has play to the left and right.
- Set the lower link balls for road transport so that the machine has no play to the left or right.

Do not lock the lower link balls
When using the machine in the field on tractors with articulated steering or a crawler chassis, the lower link balls must have play on the left and right.
If the lower link balls are locked, this could damage the tractor or the machine.

Supporting leg



- Remove the split pin from the pin.
- Remove the pin.
- Turn the supporting leg upwards.
- Supporting leg in the upper position.
- Secure with pins.
- Secure the pins with a split pin.

Connecting

After coupling, make the following connections:

- Electrical
- Hydraulics
- Brake system

Electrical connections

Attach the following electrical cables to the tractor, if installed, for:

- The electronic control system
- The lighting of the machine

- Check all connections to ensure they are working properly.

Hydraulic connections

→ Chapter »Hydraulic system«, section , page 36

Connecting the brake system [+]

If fitted with air pressure brake system:
→ Chapter »Brake system«, section , page 44

If fitted with hydraulic brake system:
→ Chapter »Brake system«, section , page 48



Only connect the hydraulics when depressurised
Only connect the hydraulic hoses to the tractor hydraulic system if the tractor and machine hydraulic system is depressurised.
A hydraulic system under pressure can trigger unpredictable movements of the machine and cause personal injury.

Check the hydraulic hoses and hydraulic couplings
Before making connections, check all hydraulic hoses for damage. Check all hydraulic couplings for firm seating after connecting them.
Defect hydraulic tubes or poorly seated hydraulic couplings can initiate unforeseen movements on the machine or lead to accidents.

Securing the control units
In the transport position, secure the control units on the tractor to prevent accidental operation.
Accidental actuation of the control units can trigger unpredictable movements on the machine and cause accidents.



Avoid mixtures of different oils
If the machine is used with different tractors, incompatible types of oil may become mixed.
Mixtures of incompatible oils can result in the destruction of tractor components.

Do not exceed the maximum fan speed
The fan speed must not exceed 5,000 rpm for hydraulic fan drives.
Higher fan speeds may damage the fan drive wheel and cause severe damage to the machine.

Familiarising yourself with the hydraulic system

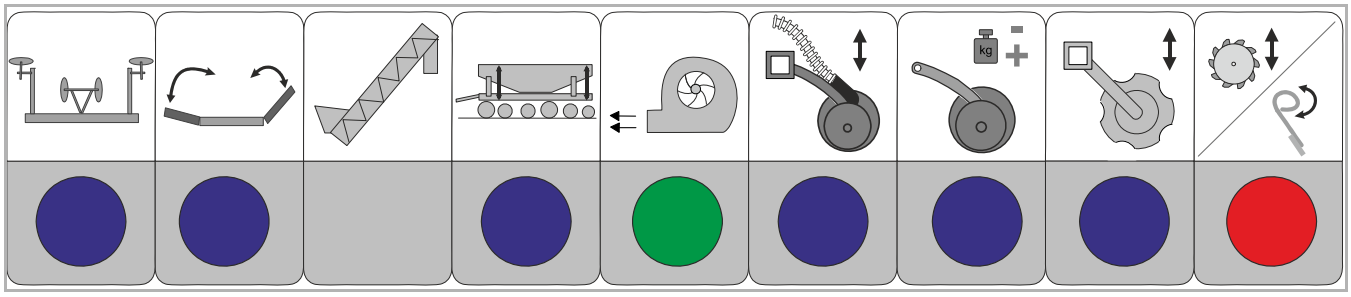
Connection to the tractor

The machine must be connected to the tractor's hydraulic system.

For tractors with a control valve with a high-priority supply:

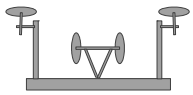
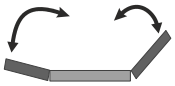
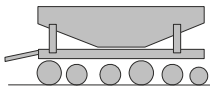
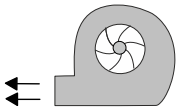
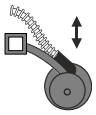
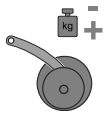
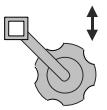
The hydraulic fan drive should be connected to a control valve with a high-priority supply on the tractor. The fan drive speed does not drop when the control unit is activated to raise or lower the machine.

The hydraulic hoses are colour-coded so that you can assign the functions to the individual hydraulic hoses more easily. The functions available on your machine are labelled on the label with coloured dots.



Control valves

- Connect the hydraulic hoses.

Symbol	Function	Control valves		Colour coding
		Single-acting	Double-acting	
	Track marker		**x**	**Blue**
	Folding machine in and out		**x**	**Blue**
	Lift or lower the machine, for 3.00 m only		**x**	**Blue**
	Hydraulic fan drive	**x**		**Green**
	Lift or lower the coulter bar		**x**	**Blue**
	Hydraulic coulter pressure adjustment		**x**	**Blue**
	Lift or lower the disc harrows		**x**	**Blue**
	Raise or lower the Clod Board [+]		**x**	**Red**

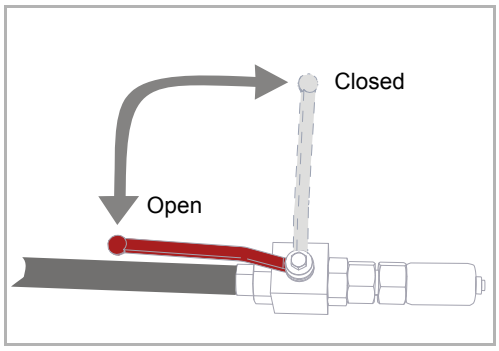
Use the software to select all of the functions that are provided via the connection that is marked in blue.

- Track marker
- Pre-emergence marker
- Lift or lower the machine
- Lifting or lowering the coulter bar
- Hydraulic coulter pressure adjustment
- Lift or lower the disc harrow
- Lifting or lowering the front wheel packer
- Lifting or lowering the track eradicator

▸ Connect the hydraulic hose.

If ball valves are present:

▸ Open the ball valves on the hydraulic hoses to the tractor.



Working with the hydraulics



Checking the hydraulic connections
Prior to operation, carefully check the hydraulic hose connections and the hoses themselves.
Hot hydraulic fluid under pressure can squirt from insufficiently tightened or damaged hydraulic hoses, resulting in serious injury.

Check the following:

- The connection to the electronic control system is suitable

Lifting or lowering

Use the corresponding control unit on the tractor to lift the machine or to lower it into the work position. When the machine is lifted the tools are lifted far enough above the ground that it is possible, for example, to run the machine on the headland.

The deposit depth can be set in work position.
→ Chapter »Preparations in the field«, section »Setting Work«, page 110

Folding in or out



The machine can only be folded in when the implements are lifted
The machine must only be folded in when the tools are lifted. The disc harrow, for example, is one of the tools.
If you fold the machine in directly from the work position, the machine will be badly damaged.

The machine can be folded out to work position or folded in to transport position by way of the corresponding control unit on the tractor.
→ Operating manual for the software, section »Other applicable documents«, page 5

Folding in

▸ After folding, actuate the control unit on the tractor for a further 3 seconds. Whilst the control unit is active, deselect folding on the terminal.

Folding the track markers

The track markers are controlled via the software.
→ Operating manual for the software, section »Other applicable documents«, page 5

If the track marker is folded in before an obstacle, the metering device continues to operate.

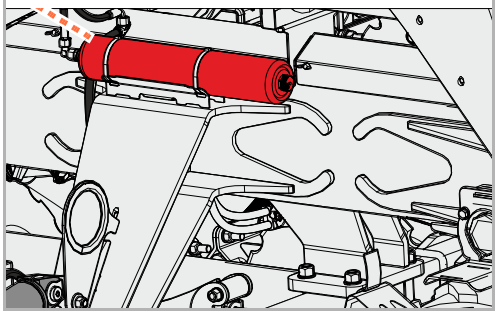
Master-slave system

The machine is fitted with a master-slave system which uses the quantity of oil efficiently. All hydraulic cylinders used for a particular function are activated at the same time, and move to the desired position.

The master-slave system automatically synchronises once the hydraulic cylinders reach the end positions.

Damping the side sections

Piston accumulator



The machine has hydraulic damping for the side sections. If one side section pushes upwards when travelling over uneven terrain, the hydraulic damping over the piston accumulator protects the side sections against overloading.

Hydraulic fan drive

The oil flow is directed to the flow control valve and is thus regulated according to the speed of the hydraulic motor. This constant fluid rate results in a specific rotational speed of the hydraulic fan drive. You control this speed via the electronic control system.

Technical specifications

Refer to this table for the technical data for the hydraulic fan drive:

Hydraulic fan drive		Values
Hydraulic motor	Displacement [ccm] Speed [rpm]	11 5000
Oil supplies	Minimum feed line pressure [bar] Maximum return line pressure [bar] Oil flow rate [l/min]	120 5 55
Fan	Maximum fan speed [rpm]	5000

The rotational speed has a fluctuating range of ± 50 rpm if the rotational speed has been set at a constant oil temperature.

Line diameters



Do not alter cross sections
If cross sections are altered, the pressure conditions in the hydraulic system are changed. Also check plugs and connections for the correct cross section.
Altering a cross section may cause damage to the components in the hydraulic system. Hydraulic motors may be damaged, for example.

- Feed line: Minimum dimension DN 16
  outer diameter = 18 mm, inner diameter = 13 mm
- Return line: Minimum dimension DN 16
  outer diameter = 18 mm, inner diameter = 13 mm
- Oil leak pipe: minimum dimension DN 06
  outer diameter = 9 mm, inner diameter = 6 mm

Requirements

Prerequisites for the hydraulic fan drive on the tractor:

- Sufficient oil supply by the tractor
- Corresponding number of control valves
- Parallel activation of the control valves
- Oil cooler

Fan speed



Checking the hydraulic connections
Prior to operation, carefully check the hydraulic hose connections and the hoses themselves.
Hot hydraulic fluid under pressure can squirt from insufficiently tightened or damaged hydraulic hoses, resulting in serious injury.

Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

The basic settings for the flow control valve must be made only during initial operation or when changing tractors.

To convey the seed to the seed coulters, comply with the following fan speeds:

Seed	Fan speed [rpm]
Fine seeds	Minimum 3200
Normal seed	Minimum 4500
Coarse seed	
Technically permissible fan speed	Maximum 5000



When seeding, ensure that no seed is blown out of the furrow. Then correct the fan speed accordingly.

Tractors with flow control valve

- Actuate the control unit on the tractor.
- Adjust the desired rotational speed via the quantity of oil at the tractor.

Operation



Checking the hydraulic connections
Prior to operation, carefully check the hydraulic hose connections and the hoses themselves.
Hot hydraulic fluid under pressure can squirt from insufficiently tightened or damaged hydraulic hoses, resulting in serious injury.

Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

Initial commissioning

For the initial commissioning with cold oil the following applies:

- The fan speed will continue to alter automatically until the hydraulic oil has reached the operating temperature
- Only when the fan speed persists the setting is completed
- Constantly check the fan speed during the settings at the electronic control system.

→ Operating manual for the software, section »Other applicable documents«, page 5

Repeated commissioning

For the repeated commissioning with cold oil the following applies:

- The fan speed is higher in the warming up process.
- After a short period of time, the fan speed settles down to the value set during initial operation

Brake system

The machine can be equipped with an air pressure brake system or a hydraulic brake system. Both brake systems have the option of braking manually.

Do not drive with engaged brakes
Before every drive, ensure that the brakes are released and are not applied manually. Driving with engaged brakes can destroy the brakes and cancel the braking effect.
Driving without braking effect may result in accidents.

Air pressure brake system

The machine's air pressure brake system is a dual-line system.

For transport purposes the machine must always be attached to a tractor with an appropriate air pressure brake system.

Without compressed air, the brakes are mechanically locked. In an emergency, the brakes can be released with a special tool.

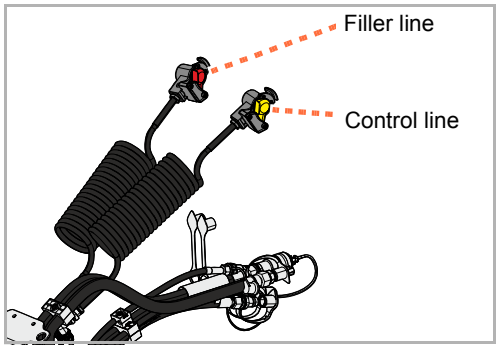
Connection to the tractor

Connect the air pressure brake system to the tractor using two hoses:

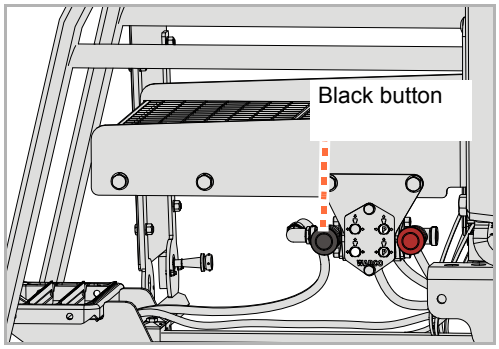
- Control line with yellow marks
- Air supply line with red marks

▸ Secure the machine.

→ Chapter »Maintenance«, section »Securing the machine«, page 137



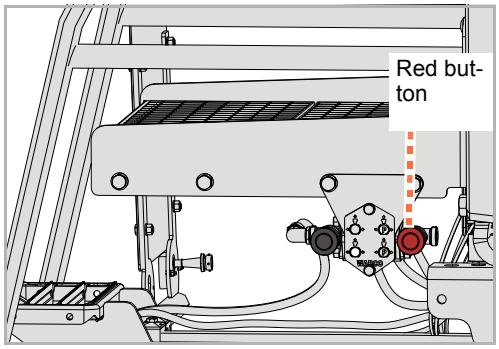
▸ Connect the control circuit (yellow).
▸ Connect the air supply line (red).
▸ Check the hoses for firm seating.



- Fill the system with air from the tractor until the pressure relief valve reacts at the tractor.

The black button comes out. The brake system is now operational.

Manual braking



- Press in the red button.

Cancelling the manual braking effect:

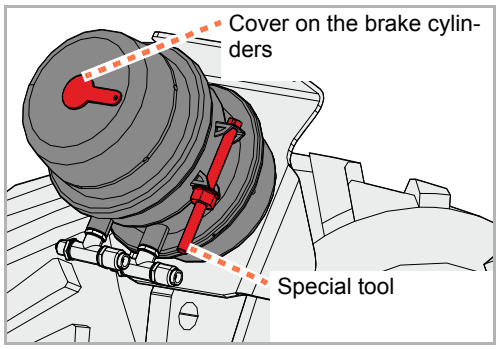
- Pull the red button out again.

Cancelling the braking effect

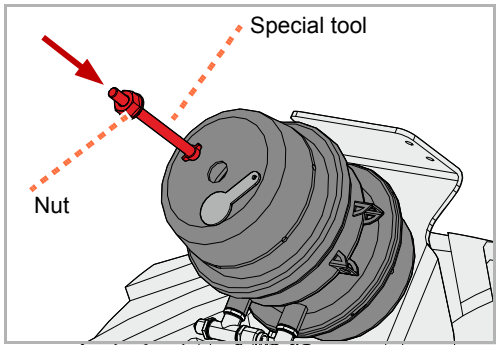
The braking effect can be cancelled with the help of the supplied special tool or at both brake cylinders.

Only cancel the braking effect in an emergency
The braking effect must only be cancelled in an emergency. Road transport without the braking effect is prohibited.
Driving without the braking effect may lead to accidents.

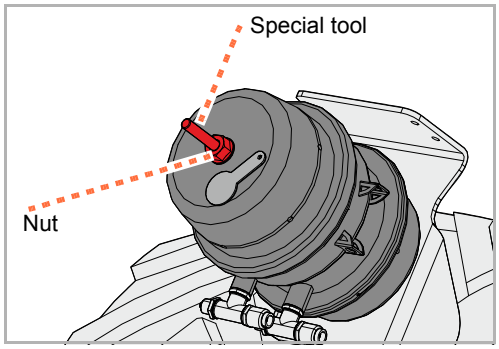
Use sufficiently dimensioned tractors
The tractor performing the shunting manoeuvre must be able to brake the unbraked machine at any time.
This could otherwise result in serious accidents.



- Use a 24 mm spanner to unscrew the special tool from the parking position.
- Open the cover on the brake cylinder.

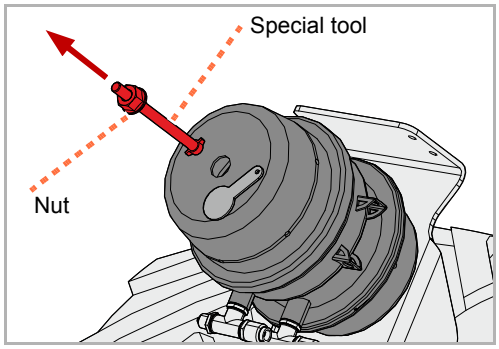


- Insert the special tool into the opening on the brake cylinder and turn it until the special tool locks.

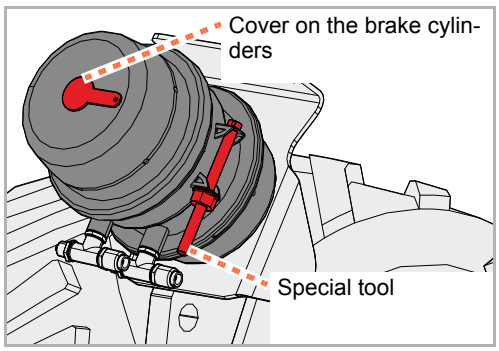


- Use the 24 mm spanner to screw in the nut on the special tool until the braking effect has stopped. The braking effect will remain cancelled for as long as the special tool is screwed in.

Restoring the braking effect



- Use the 24 mm spanner to undo the nut until the special tool is loose.
- Turn the special tool until it can be removed.



- Secure the special tool in park position.
- Use the cover to close the opening on the brake cylinder.

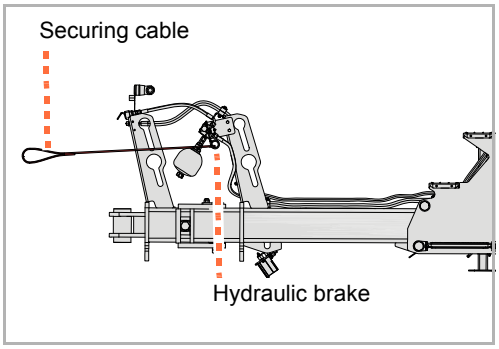
Hydraulic brake system

The hydraulic brake system of the machine is equipped with a special coupling. For transport purposes, the machine must therefore always be attached to a tractor with an appropriate hydraulic brake system with special coupling.

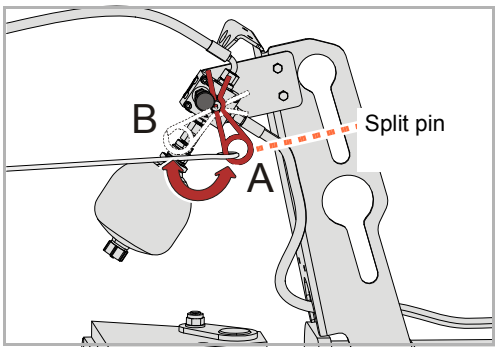
Attach the securing cable to the tractor
With hydraulic brake systems, the securing cable must be secured to the hydraulic brake and to the tractor. If the machine becomes separated from the tractor, the machine is forcibly braked via the cable. Road transport without securing cable is prohibited.
A machine which is not forcibly braked can move uncontrollably if torn from the tractor. This can result in accidents.

Connection to the tractor

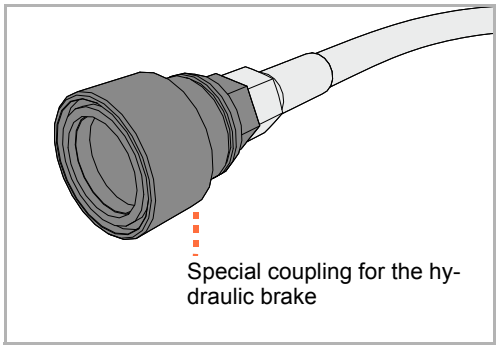
In addition to connecting the hydraulic hose, the machine and tractor must be connected using a securing cable.



- Fasten the securing cable for the hydraulic brake to a suitable point on the tractor.



- Check the position of the split pin. The split pin must be in position "A" for road transport.



- Connect the hydraulic hose to the hydraulic brake at the tractor.
- On the tractor, press hard on the brake pedal several times so that the pressure accumulator of the brake system fills.

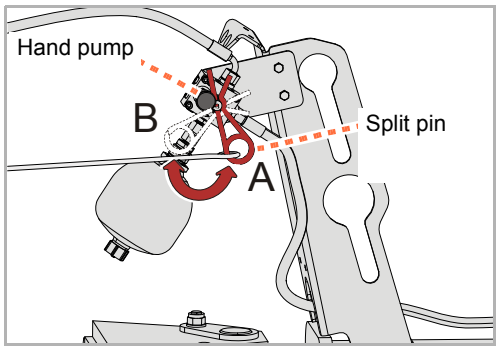
If the machine cannot be moved:

- Check whether the machine has been braked manually.

Chapter »Brake system«, section »Hydraulic brake system«, page 48

Manual braking

Activation via oil pres-

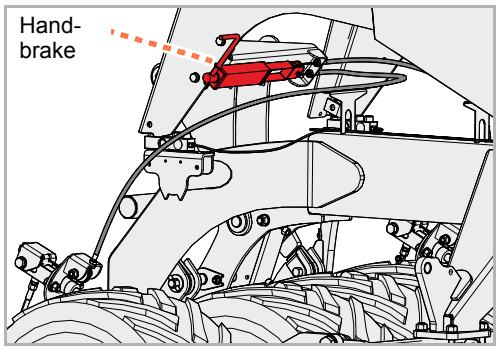


- Move the split pin to position "B".

Cancelling the manual braking effect:

- Move the split pin to position "A".
- Actuate the hand pump until the braking effect has been cancelled.

Activation via control ca-ble



- Turn the handbrake clockwise to tighten.

Cancelling the manual braking effect:

- Turn the handbrake anti-clockwise to loosen.

Work preparations for soil preparation

At the farm, perform the preparation work tasks which are difficult do carry out in the field. In the field, only the fine adjustment should be performed. Depending on the machine configuration, prepare the machine for the use for the soil preparation:

- Track eradicator
- Disc harrow
- Scraper on the rear wheel packer

Prerequisites for the preparation work:

- ☑ Machine is coupled to the tractor and all connections are properly made
- ☑ Machine is in the work position
- ☑ The machine frame is parallel to the ground
- ☑ Handbrake in tractor is applied
- ☑ The machine is braked manually
- ☑ Machine is secured with wheel chocks against rolling away

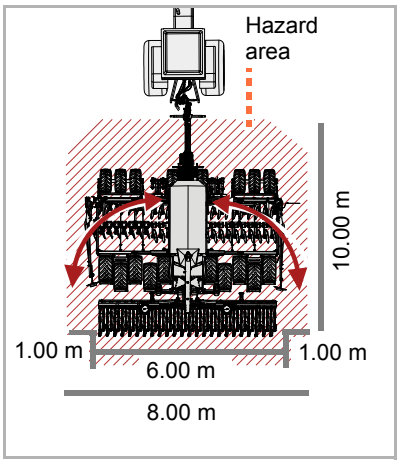
The following applies for all work:

- ▸ Loosen the bolts.
- ▸ Make settings as desired.
- ▸ Re-tighten the bolts.

The setting of the tools can only be made with the machine in work position.

Folding out

The side sections are folded out when the machine is folded out. The tools remain in a lifted position after the machine is folded out. The machine can be moved on the field in this position.

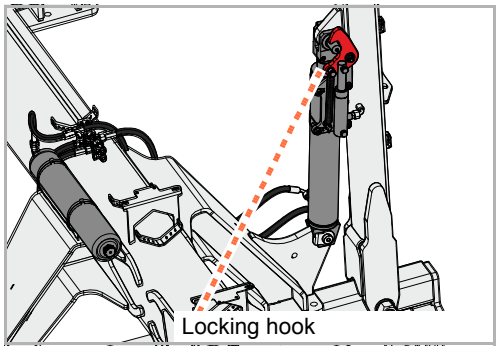


No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.

Observe the machine when folding
Observe the machine while folding in or folding out.
If machine behaviour is unusual when folding the machine in or out, interrupt the folding operation immediately and determine the cause.
This will prevent damage to the machine.

The folding-in process is controlled by the electronic control system.
→ Operating manual for the software, section »Other applicable documents«, page 5

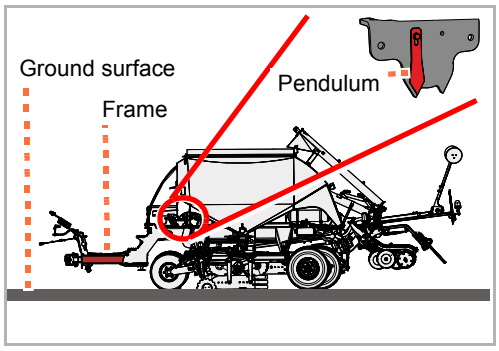
Loosening the locking hook
Before folding out the machine, fold it in and loosen the locking hook.
This will prevent damage to the machine.



- Fold the machine in again first.
- Loosen the locking hook.
- Fold out the machine.

Tools for the soil preparation

Working depth



Now, you can set the working depth of the soil preparation tools. The fine adjustment is accomplished later on the field.

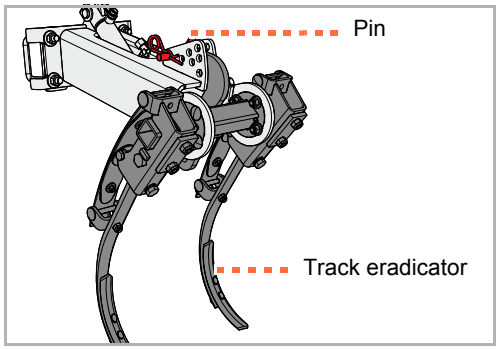
The machine has to be lifted and secured for these adjustment works. The frame must be parallel to the surface of the ground. The pendulum displays the correct alignment.

- Set the tractor's lower link ball accordingly.

Track eradicator [+]

You can set the working depth of the track eradicator to loosen the tracks from the transport wheels.

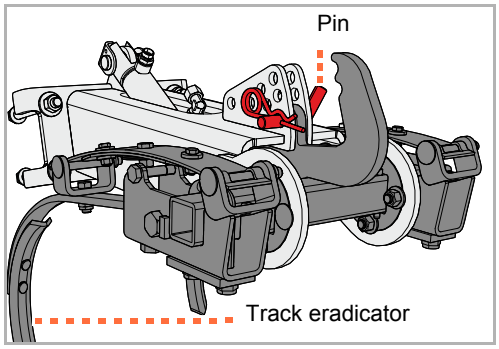
Setting of the working depth



Make identical changes to all brackets:

- Lift the machine.
- Remove split pin from pin.
- Remove the pin and insert it into the new position in the regulating piece.
- Secure the pin with a split pin.

Track eradicator not working



Lift the track eradicator so that no marks become loose.

Make identical changes to all brackets:

- Lift the machine.
- Remove split pin from pin.
- Remove the pin and insert it into position in the regulating piece as shown.
- Secure the pin with a split pin.

Disc harrow

Risk of injury through cutting
Wear protection gloves. Cover discs with a blanket or something similar.
When working without protection gloves and a cover, cutting injuries may occur if someone touches the discs.

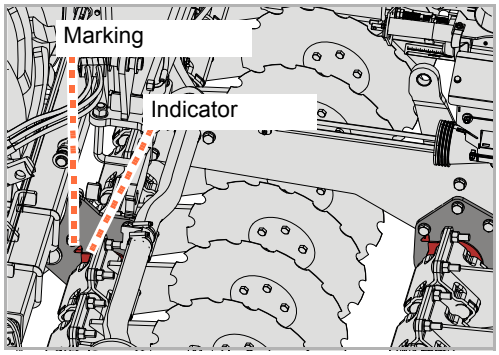
You can set the following on the disc harrow:

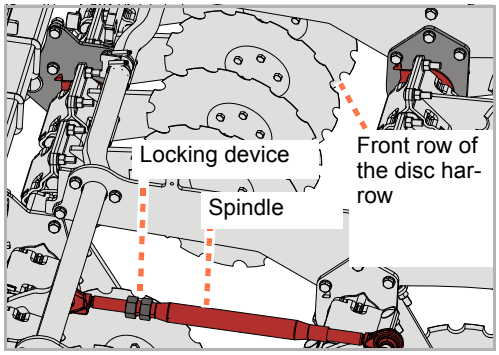
What	Where
Working depth	Software → Operating manual for the software, section »Other applicable documents«, page 5
Working depth proportional to the front row of the disc harrow in relation to the rear row of the disc harrow	On the machine with spindles

Same working depth

First, set the same working depth for both rows of the disc harrow. There is a marking on the sides of the disc harrow to help you with this.

- Raise the disc harrow.
- Check whether the markings on both rows match the indicators.





If the markings and the displays do not match:

- Release the securing mechanism on the spindle.
- Use the spindle to set the front row of the disc harrow in such a way that the marking and the indicator match.
- Make this adjustment for both side sections and the centre section.

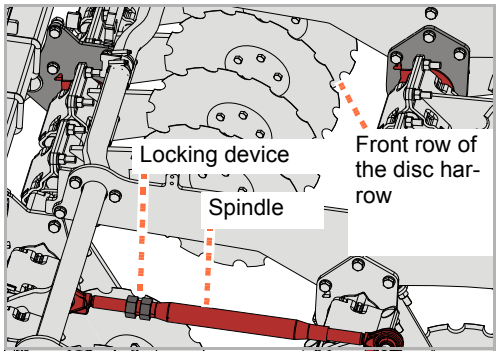
Both rows of the disc harrow now work at the same working depth.

Different working depth

As a result of adjusting the rows to the same working depth, you can adjust the front and rear row of the disc harrow differently.

The machine may pull to one side due to the soil conditions. You can rectify this by adjusting the disc harrow.

Machine pulling to the right	Set the rear row of the disc harrow to be deeper than the front row
Machine pulling to the left	Set the front row of the disc harrow to be deeper than the rear row

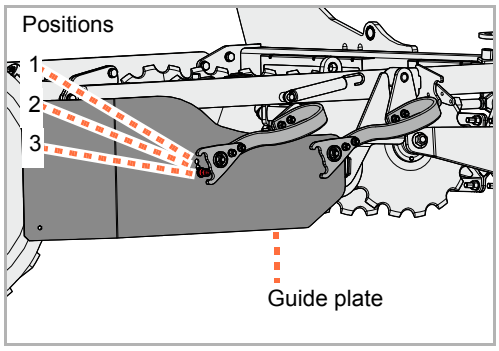


- Release the securing mechanism on the spindle.
- Use the spindle to set the front row of the disc harrow in such a way that the marking and the indicator match.
- Make this adjustment for both side sections and the centre section.

Setting the guide plates

The working depth of the guide plates can be set to several positions.

Position	Working depth
1	Shallow
2	medium
3	Deep



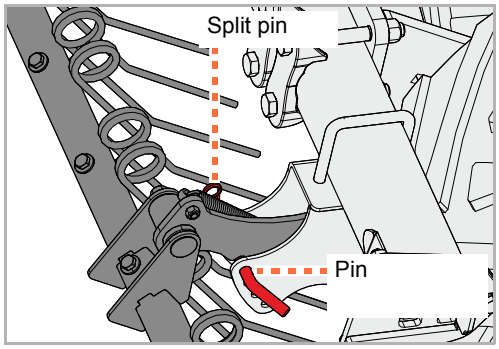
- Move the machine into the headland position.
- Loosen the nut and pull out the bolt.
- Insert the bolt in a new position and secure with a nut.

Intermediate harrow [+]

You can set the working depth on the intermediate harrow behind the disc harrow:

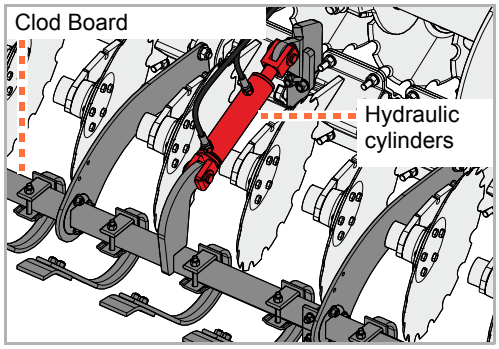
Depending on the soil conditions, adjust the regulating piece to regulate the depth setting for the seed-covering harrow.

Little plant residue	=	Lower position
Lots of plant residue	=	Top position

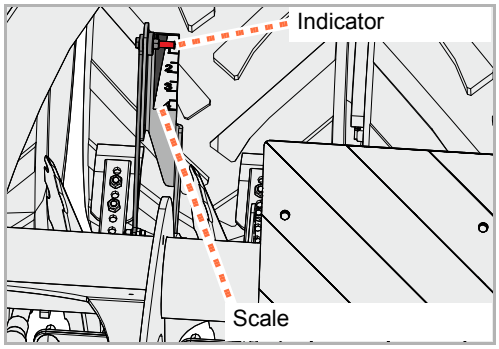


- Lift the machine.
- Remove the split pin from the pin.
- Remove the pin.
- Insert the pin in a new position and secure with a split pin.

Clod Board [+]



The Clod Board is located behind the disc harrow. The Clod Board is connected to the disc harrow in such a way that it is adjusted in a specific ratio with the disc harrow.
Adjust the operating intensity of the Clod Board via the hydraulic cylinder that connects the disc harrow and Clod Board.



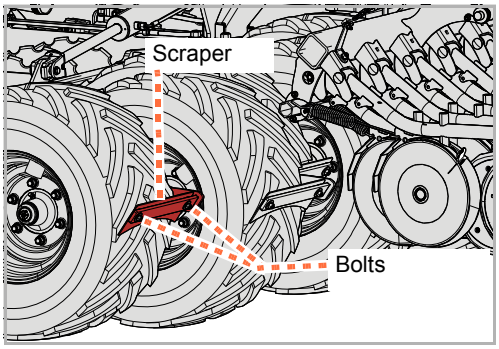
The selected position is displayed by the indicator on the scale.

Operating intensity	Position
Low	1
Medium	2 and 3
High	4

Move the hydraulic cylinder into the required position using the tractor's control device.

Scraper [+]

The scrapers are fitted behind the transport wheels. The scrapers must not touch the wheels. There must be at least a 5 mm distance between the wheel and scraper.



- Release the bolts, and move the scraper as desired.
- Secure the scraper using bolts.

Depending on the machine configuration, prepare the following for sowing:

- Track marker
- Seed coulters with fertiliser supply
- S-tine harrow or finger-tine harrow
- Pre-emergence marker
- Shut-off valves
- Hopper low level sensor
- Reduction head
- Seed
- Air stream
- Metering device and calibration test

Prerequisites for the preparation work:

☑ Machine is coupled to the tractor and all connections are properly made

☑ The machine is in its work position

☑ The machine frame is parallel to the ground

☑ Handbrake in tractor is applied

☑ The machine is braked manually

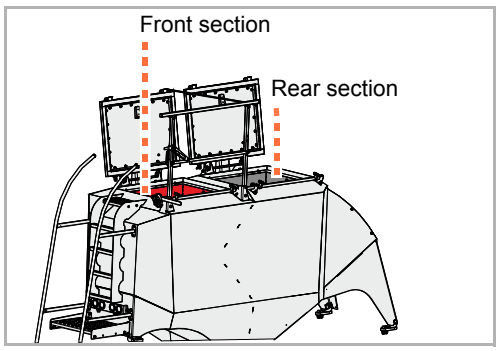
☑ Machine is secured with wheel chocks against rolling away

The following applies for all work:

- Secure the machine.
- Lower the machine to its work position.
- Make settings as desired.
- Move the machine back to the transport position.

Hopper for seed and fertiliser

Hopper division

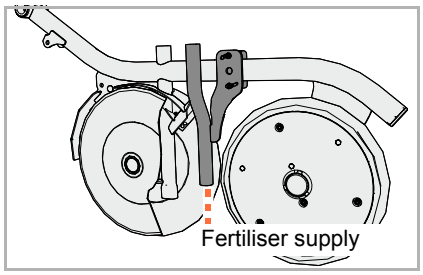


The hopper consists of two sections that are used for seed and fertiliser. The front section holds 40% of the total volume, and the rear section holds 60%.

You can replace the section for fertiliser with a section for seed.

The following load capacities apply to both sections
:

Sections	Seed (wheat)	Fertiliser (calcium ammonium)
front 40%	1350 kg	2060 kg
rear 60%	1720 kg	2580 kg

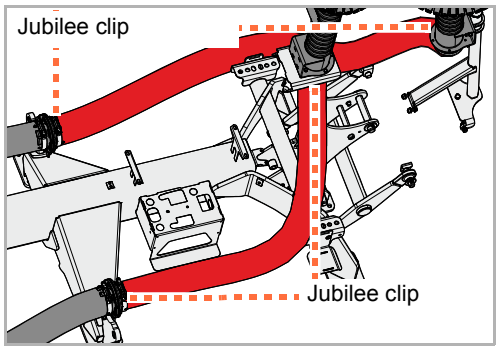


If you want to apply seed using machines that have seed coulters and fertiliser supply, you can use both sections of the hopper for seed.

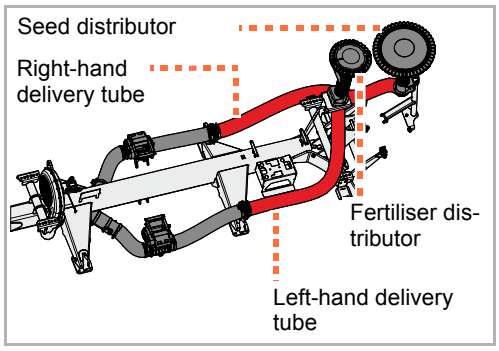
This process requires each metering device to deliver half of the required application rate.
→ Operating manual for the software, section »Other applicable documents«, page 5

Changing the sections

You can replace the section for fertiliser with the section for seed if you want to apply more seed than fertiliser.



- Undo the jubilee clips on the delivery tubes.
- Undo all other fastenings on the delivery tubes.
- Remove both delivery tubes.



- Switch the right delivery tube with the left delivery tube.
- Reattach both delivery tubes.
- Secure the end of the delivery tubes with the jubilee clips.
- Reattach all other fastenings on the delivery tubes.

Track marker

During the forward pass, the track markers mark a path in the seed bed for the return pass. To enable this, set the track markers as follows:

- To the centre of the tractor:
  The centre of the tractor travels over the mark.

Setting to tractor centre

You will need the following information:

- Row spacing of the seeding machine
  (= distance between coulters)
- Working width of the seeding machine

▸ Fold the machine into its work position.

▸ Lower the track marker.

Calculation

Length of the track markers for tractor centre =

$$\frac{\text{Row spacing + working width}}{2}$$

Example

Example

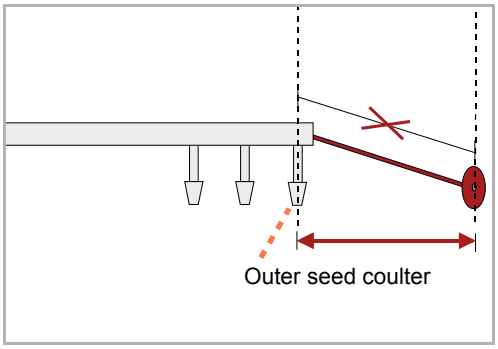
Row spacing of the seeding machine	12.5 cm
Working width of the seeding machine	600.0 cm

In this example, the calculated length of the track markers is 306.25 cm.

Adjusting

Measure out the calculated track marker length on the ground, never directly on the track marker arm. That would introduce inaccuracies.

On the machine, the track marker is far removed from the coulter. To determine the correct length of the track marker, it is advisable to lay in place, for example, a batten in the extension of the coulter, and in that way, determine the measuring point at the height of the track marker.



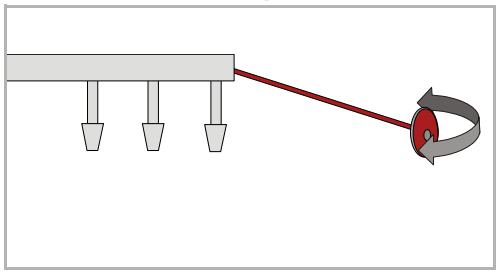
Right track marker arm:

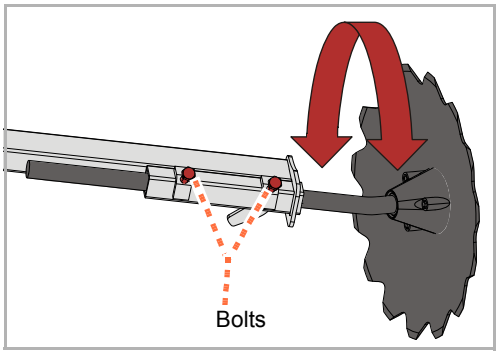
▸ Begin the measurement in the centre of the outer right coulter.

Lefttrack marker arm:

▸ Begin the measurement in the centre of the outer left coulter.

Inclination angle





The setting for the inclination angle of the marker disc depends on the soil conditions.

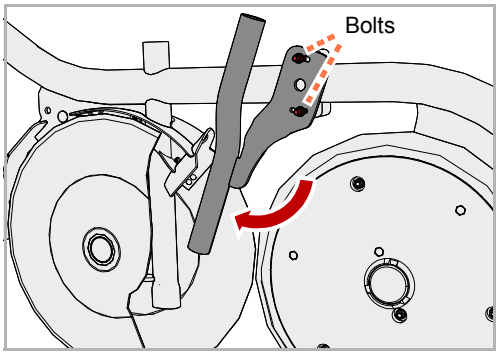
Heavy soils	=	Disc angled, Set the inclination angle
Light soil	=	Disc vertical, set no or only small inclination angle

Set the inclination angle of the track marker disc so that the tracks can later be clearly seen in the field. The track markers must not “dig”.

- Loosen the bolts.
- Set the inclination angle.
- Re-tighten the bolts.

If necessary, a correction of the length of the track marker is required. Therefore, check the length after setting the inclination angle.

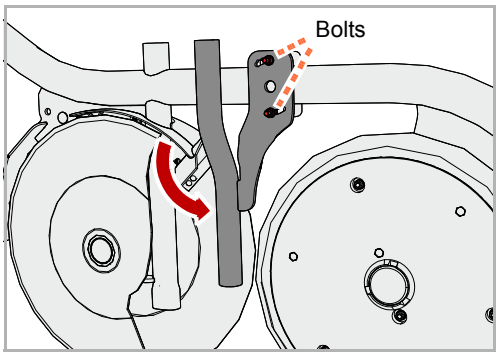
Seed coulters with fertiliser supply



On the seed coulters with fertiliser supply, you can set whether you want to position the fertiliser deep or shallow.

Deep deposit of the fertiliser:

- Loosen the bolts.
- Swivel the tube forwards. In doing so, ensure that it does not impair any elements of the CD seed coulter.
- Secure the tube with the bolts.
- Make the same settings on all seed coulters.



Shallow deposit of the fertiliser:

- Loosen the bolts.
- Swivel the tube to the rear and maintain a distance of at least 15 mm to the press wheel. In doing so, ensure that it does not impair any elements of the CD seed coulter.
- Secure the tube with the bolts.
- Make the same settings on all seed coulters.

S-tine harrow or finger-tine harrow [+]

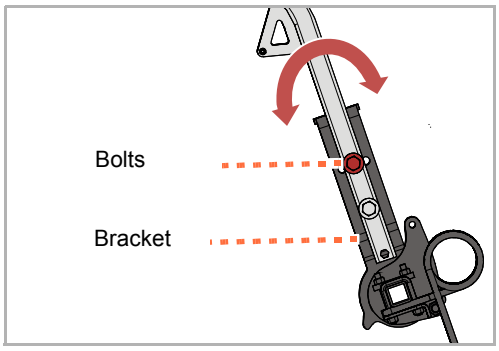
The selection of settings is the same for the S-tine harrow and finger-tine harrow. Below, the S-tine harrow are used as an example, but the information also applies to the finger-tine harrow.
You can make various settings to the S-tine harrow and finger-tine harrow:

- Inclination angle
- Bearing pressure
- Length

Inclination angle

Adjust the inclination angle by up to 45° (3 x 15°), depending on the quantity and type of crop residues.
:

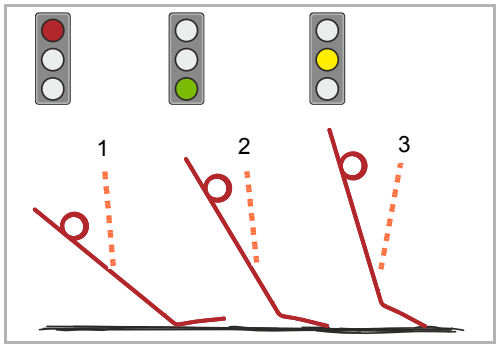
Light soil and soil without crop residues	=	Steeper inclination angle
Heavy soil and soil with crop residues	=	Flatter inclination angle



Make identical changes to all brackets:

- Loosen and remove the bolt.
- Set the inclination angle as desired.
- Reinsert the bolt and tighten it securely.

For S-tine harrows, the inclination angle must be set correctly. The angle set must not be too flat or too steep. If an incorrect angle is chosen, the harrows experience a higher degree of wear than is necessary.

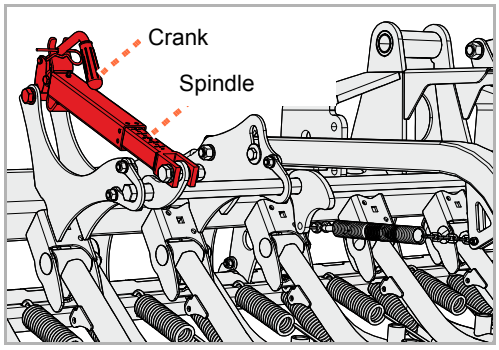


1	2	3
Flat angle	Optimum angle	Steep angle
The harrow becomes worn at the angled point	The harrow becomes worn at its end	The harrow becomes very worn and is prone to clogging from crop residues. Depending on the agronomic conditions, this position may be necessary.

Setting the bearing pressure

Depending on the soil conditions, you may have to regulate the pressure to make the depth adjustment for the seed-covering harrow.

Heavy soils	=	Set the crank to be longer
Light soil	=	Set the crank to be shorter
Out of operation	=	Set the crank to its shortest



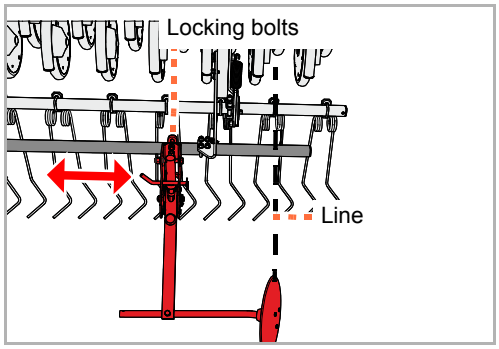
- Remove the split pin from the crank.
- Turn the crank on the spindle until the desired position has been reached.
- Secure the crank again.

Pre-emergence marker [+]

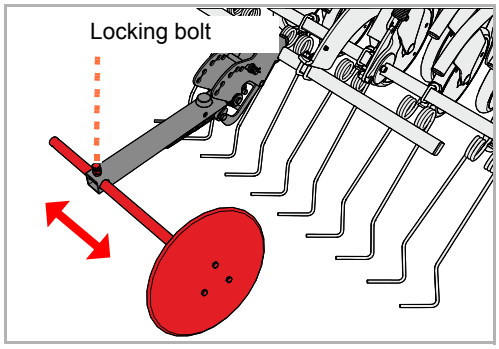
Pre-emergence markers mark the tramlines for care work and are controlled via the software.

The pre-emergence marker will lower when the seed rows for setting up the tramline are blocked.

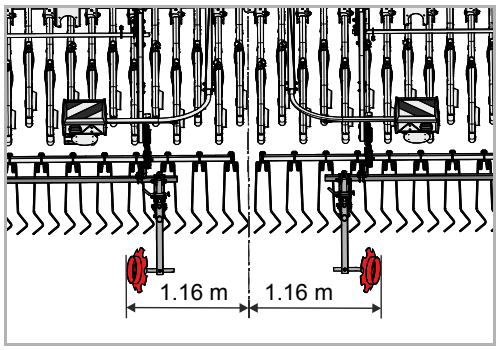
Coarse tuning



- Release the clamping bolts.
- Slide the holder outwards until the centre of the holder is three to four row spacings away from the line that is to be marked.
- Tighten the locking bolts.
- Set the second holder accordingly.



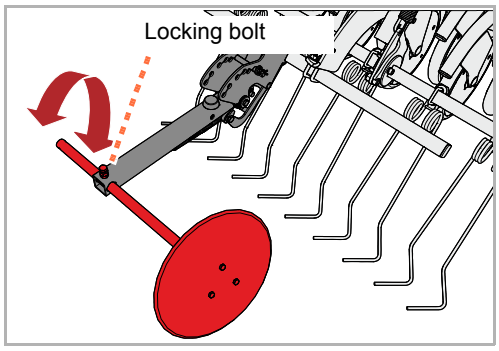
- Release the locking bolt.
- Pull the retaining arm out until the pre-emergence marker passes behind the blocked seed rows.
- Tighten the locking bolt.
- Adjust the second holder arm in the same way.



- Maintain the maximum distance of 1.16 m from the outermost edges of the pre-emergence marker to the machine's centre axle.

Do not exceed the maximum distance
When setting the pre-emergence marker, the maximum distance to the outer edges must not be exceeded.
If the maximum distance is exceeded, this may lead to damage to the machine in the area of the lighting equipment.

Setting the inclination angle



Use the bolt on the retaining arm to set the inclination angle of the discs.

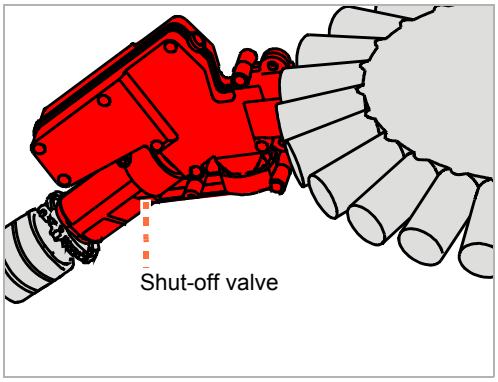
- Release the locking bolt.
- Set the inclination angle, then retighten the locking bolt.
- Adjust the second holder arm in the same way.

Ensure that this does not alter the fine adjustment.

Shut-off valves [+]

Shut-off valves regulate the setting up of tramlines. The shut-off valves block the seed flow to the coulters.

- The number of shut-off valves depends on the tyre width
- The position of the shut-off valves depends on the track width of the spraying/fertilising tractor



If the track width or tyre width of the tractor changes, contact your dealer. You may need to have additional shut-off valves installed or have different coulters blocked.

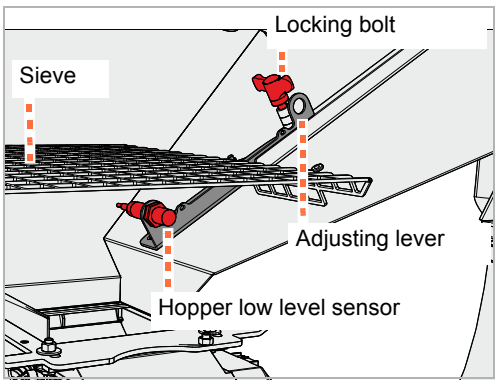
Hopper low level sensor [+]

You can set the hopper low level sensor to various residues. An alarm indicates that the set residue has been reached.

The size of the residue depends on:

- Type of seed
- Application rate
- The working width of the machine
- The length of the field

Only adjust the hopper low level sensor when the hopper is empty
The area in which the hopper low level sensor is to be adjusted must be free of both seed and fertiliser.
If there is fertiliser or seed in the area, the hopper low level sensor may be damaged.



- Release the locking bolt.
- Set the required residue at the adjusting lever. The hopper low level sensor may be below or above the sieve.
- Tighten the locking bolt.

For the calibration test, the hopper low level sensor must be covered with seed or fertiliser to a depth of at least 3 cm.

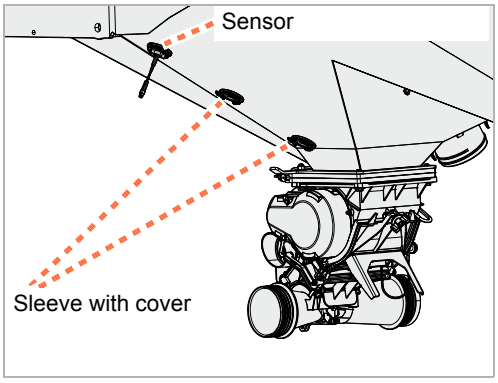
At low application rates that do not cover the hopper low level sensor at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".
→ Operating manual for the software, section »Other applicable documents«, page 5

Level indicator [+]

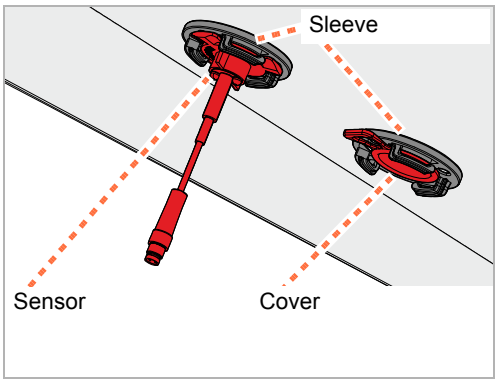
You can set the level indicator to various residues. An alarm indicates that the set residue has been reached.

The size of the residue depends on:

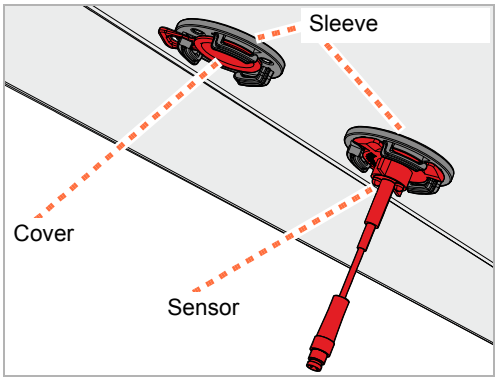
- Type of seed
- Application rate
- The working width of the machine
- The length of the field



The level indicator sensor is installed in a sleeve in the hopper. Other sleeves are provided for different fill levels.



- Turn the cover on the required sleeve clockwise and remove it.
- Turn the sensor clockwise and remove it.



- Insert the sensor into the sleeve for the appropriate fill level and turn it counter-clockwise. The sensor is secured.
- Place the cover on the sleeve that is still open and turn it counter-clockwise. The cover is secured.

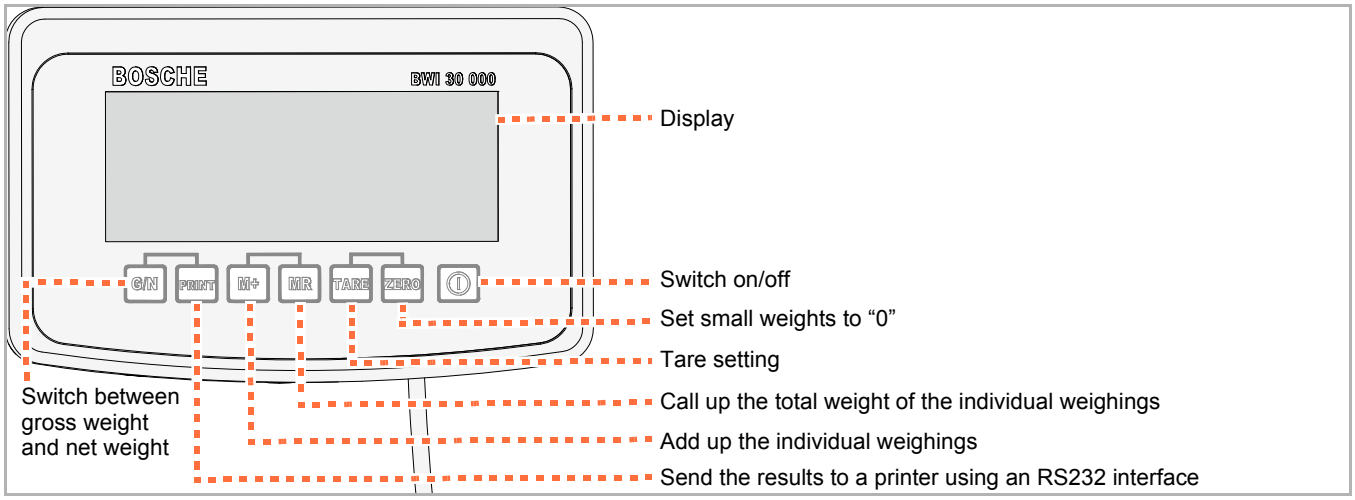
For the calibration test, the level indicator must be covered with seed or fertiliser to a depth of at least 3 cm.

At low application rates that do not cover the level indicator at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".
→ Operating manual for the software, section »Other applicable documents«, page 5

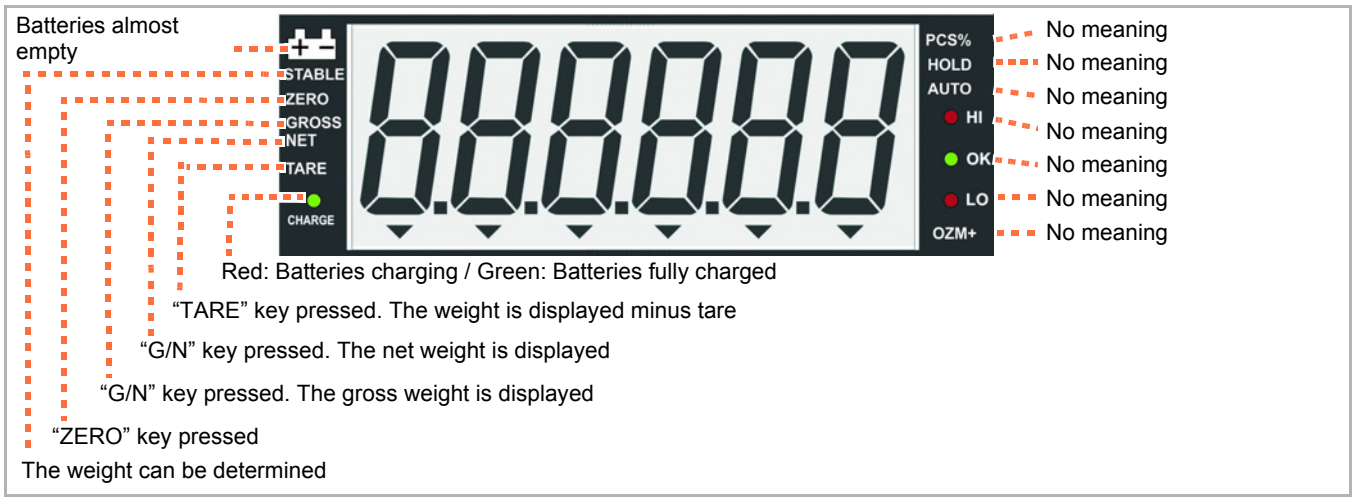
Weighing system [+]

You can use the weighing system [+] to determine how much seed there is in the seed hopper or how much has been applied to a surface.

Keys



Display



Detailed operating instructions for the Bosche electronic weighing system are enclosed with the machine.

Technical specifications

Temperature range	-30 – 70 °C
Internal battery	12 V
Weighing range	1000 g– 5000 kg
Tolerance	10 kg/1 g 100 kg/10 g 500 kg/50 g 5000 kg/500 g
Manufacturer	Bosche GmbH & Co. KG Reselager Rieden 3 49401 Damme, Germany

The scales are not subject to compulsory calibration. Therefore, they must not be used for the sale of goods by weight.

Safety

At the factory, the weighing system is set for use in a seeding machine. However, the weighing system can be universally employed. You can use the operating instructions to change the settings. Changes may lead to incorrect results when weighing seed.

Observe the range of use
The scales are envisaged only for the weighing of goods within the specified weighing range.
Deviations from the actual weight can occur within the specified tolerances.

Switching on



- Press the key.

The scales are calibrated and ready to operate when “0.0 kg” or “0.0 lb” is displayed.

Adjusting

You can switch the weight display from kg to lbs. The conversion is retained after switching off.



- Press and hold the key until the desired unit is displayed.

Position “0”

If the scale does not display "0 kg" or "0.0 lb", even though the seed hopper is empty, this may be caused by smaller residues or temperature fluctuations. Set the display to "0" prior to weighing.



- Press the key.

Tare

Tare is required if you do not want an existing weight to be displayed.



Tare does not display the total weight
After pressing the “TARE” key, only the weight that is subsequently added to the seed hopper is displayed. By pressing the ”G/N” key, you can switch between the total weight and tare. To determine the total weight, ensure that tare is not displayed.
Accidents can occur if the total weight is incorrectly estimated.



- Press the key.



You have 200 kg of a specific seed in the seed hopper. You want to top this up with 300 kg of a different seed. You can then press the “TARE” key. The display shows “0” and you can add the other seed until 300 kg is displayed. In total, there are 500 kg of seed in the seed hopper.



- By pressing the “G/N” key, the total weight is displayed again.
- If, after pressing the "TARE" key, the weight is smaller, this is displayed by a minus sign.
- The set tare is cleared when you switch the machine off.

Adding weights

You can add the results of individual weighings.



- Press the key. The weight is saved in the memory. You can call up the total weight of the weighings using the “MR” key.

Calling up the total weight

If you have added a number of results of individual weighings, you can call up the total weight of the weighings.



- Press the key.

Deleting values

If you want to delete the total weight of a number of individual weighings, you can delete the saved value.



- Press the keys simultaneously.

Printing

To connect to a printer you will need an RS232 serial connection cable.



- Press the key. The values of the weighing are sent to the printer.

Switch off



- Press the key.

Charging the batteries

The terminal runs on the batteries for approximately 30 hours. As soon as the “Battery almost empty” symbol appears on the display, the batteries should be charged at the tractor's 12 V board voltage socket.



The terminal will continue to run for another 5 hours after the symbol appears. Then the terminal switches off.

The charging time at the tractor's 12 V board voltage socket is approximately 12 hours.

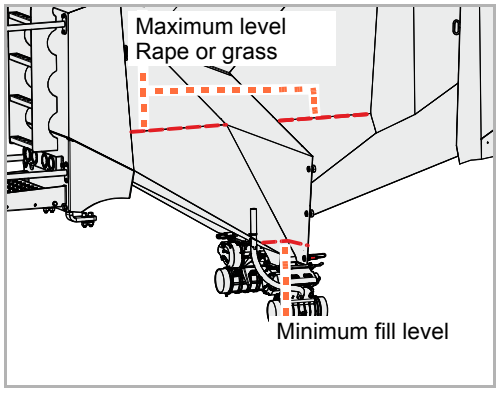
Filling with seed

No manual filling
Do not carry any loads when climbing onto the machine as you have to hold on with both hands.
Climbing on without the ladder or with a load can cause accidents.

Observe maximum fill level
The maximum fill level depends on the seed. The maximum fill level must always be observed. Rape and grass can be filled up to the top edge of the screen in the hopper, but no further.
If the max. fill level is exceeded, this can result in patchy seeding.

- Minimum seed hopper fill level:

For grain	30 cm above the base of the seed hopper
For rape or grass	5 cm above the base of the seed hopper



Maximum seed hopper fill level:

For grain	Top edge of the seed hopper
For rape or grass	Top of partition between chambers in metering devices

Dressed seeds

Dressing only in accordance with manufacturer's instructions
Dress seeds only in accordance with the manufacturer's instructions and observe all relevant safety precautions when dressing and handling dressed seeds.
Never dress seeds:

- In the machine
- By hand
- When filling the seed hopper

Failure to observe this information may endanger your health.

For fine seeds, note the following:
Glutinous dressing agents can have a negative influence on metering accuracy.

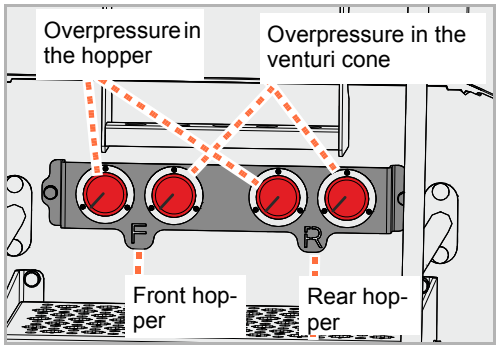
If you intend to dress the seeds yourself, you must observe the dressing manufacturers safety information.

Hopper with overpressure

For the seeding, an overpressure builds up inside the hopper. To avoid overpressure escaping, the covers must be closed.

Pressure display

The overpressure inside the front hopper and the rear hopper and on the associated venturi cones is displayed via the manometer.



▸ Reading overpressures on the manometers.

The difference between the overpressure levels within the hopper and on the accompanying venturi cone must not exceed 5 mbar.
The overpressure for one hopper may differ significantly from that of the other hopper, particularly if the air stream is reduced for applying the seed.

Close the cover
Close both the covers before sowing in order to build up overpressure in the hopper.
If the covers are not closed it may lead to incorrect metering.

Road transport

You must not drive on roads with a full seed hopper or full fertiliser hopper. The maximum permissible axle load must not be exceeded.



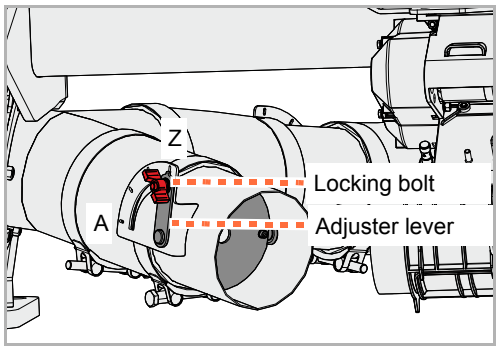
Comply with permissible axle loads
Road transport may only take place up to the maximum permissible axle load of the machine.
A filled seed hopper or fertiliser hopper influences the driving performance of the machine if overloaded and can cause accidents during road transport.
→ Maximum permissible weights: Chapter »Safety«, section »Permissible axle load of the machine«, page 17
→ Maximum permissible weights: Chapter »Familiarising yourself with the machine«, section »Technical specifications«, page 28

Reducing the air stream

During the seeding, fine seed, such as rape or grass may be blown out of the seed furrow by the fan. If this is the case, you must reduce the fan's air stream for the side with seed. The side for fertiliser does not need to be reduced.

Regulating flap

The regulating flap on the fan regulates the airflow for the seed. The default setting is “ON”. If seed is being blown out of the seed furrow, close the regulating flap.



- Release the locking bolt.
- Move the adjuster lever into the required position.

CLOSED	=	Z
OPEN	=	A

- Secure the adjuster lever with a locking bolt.

Metering device

The metering device is controlled via the software. Information about adjustments made to the metering device is displayed on the terminal.
→ Operating manual for the software, section »Other applicable documents«, page 5

Maximum application rate

Before the calibration test, define the application rate.

The application rate is dependent on:

- The machine's equipment
- The diameter of the distribution system
- The working width
- The driving speed
- The rotor

The greater the driving speed, the lower the possible application rate. When the application rate increases, you should therefore reduce the driving speed.
Failure to observe leads to poor work results.

The maximum conveying capacity for this machine is 64.0 kg/min.

Calculation

You can use the following formula to calculate the maximum application rate:
Maximum application rate =

$$\frac{\text{Maximum conveying capacity x}}{\text{Driving speed x Working width}}$$

Example

Example

Maximum conveying capacity of the seeding machine	64.0 kg/min
Driving speed of the seeding machine	12.0 km/h
Working width of the seeding machine	6.00 m

$$\frac{64.0 \text{ x } 600}{12.0 \text{ x } 6.00} = 533.3$$

In this example, the calculated maximum application rate is 533.3 kg/ha.

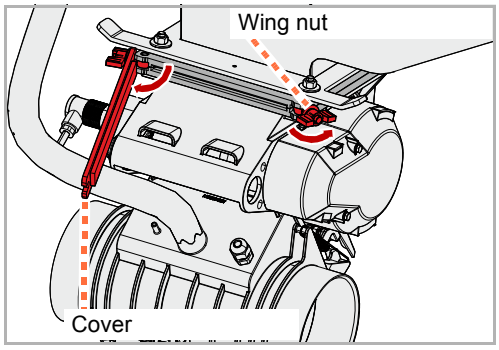
Preparing the machine

- Machine in work position.

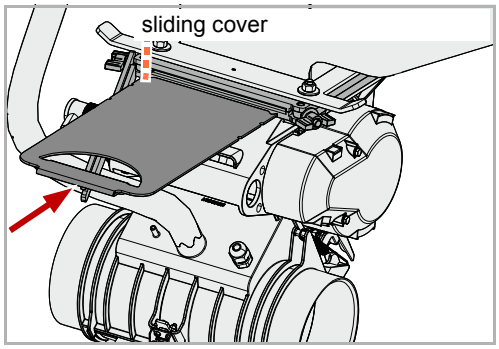
→ Chapter »Hydraulic system«, section »Lifting or lowering«, page 39

- Secure the tractor against rolling away and being started without authorisation.

→ “Tractor” operating manual



- Loosen the wing nut.
- Open the cover.



- Take the sliding cover out of the tool case.
- Close the sliding cover on the metering device. No more seed can flow from the seed hopper into the metering device.
- Fill the seed hopper with enough seed for the calibration test.
- Select a program using the software:

Program	Operations
New calibration test	• Open the flap for the calibration test • Install the suggested rotor • If required, install an auxiliary plate
Saved calibration test	• Select the calibration test • Install the corresponding rotor • If required, install an auxiliary plate

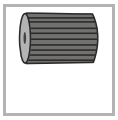
- Set up the calibration test with the software.

→ Operating manual for the software, section »Other applicable documents«, page 5

You can set the height of the sensor for the level indicator in the seed hopper. At low application rates that do not cover the level indicator at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".

→ Operating manual for the software, section »Other applicable documents«, page 5

New calibration test



The software gathers information about the adjustment made to the metering device:

- Number of the rotor that is to be used
- Information about whether the auxiliary plate is to be installed in the metering device

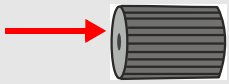
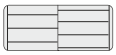
Depending on the information obtained from the software, the following adjustments can be made to the metering device:

Rotor	Auxiliary plate	What to do?
Rotor number correct	not necessary	nothing
	necessary	Install the auxiliary plate
Rotor number incorrect	not necessary	Replace the rotor
	necessary	Replace rotor and install auxiliary plate

Rotor

1...5

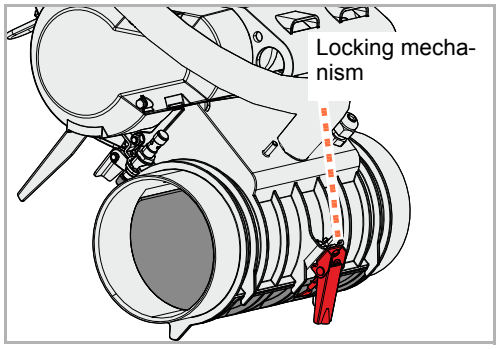
Number of the rotor. The number can be found on the side of the rotor.

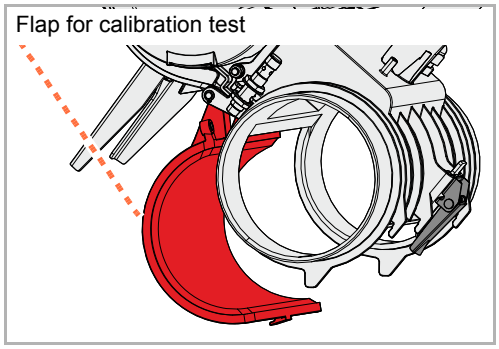
Number 	Rotor
1	
2	
3	
4	
5 [+]	

The rotor is selected by the software. The rotors have different shapes and functions. Guide pins located on rotors 3 to 5 must be inserted into a guide groove in the metering housing.

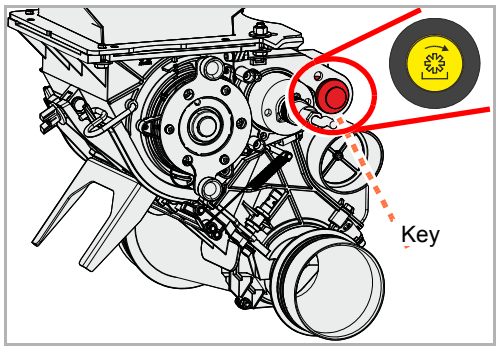
Removal

- Place a catch pan under the metering device.
- Switch on the terminal.
- Switch off the headland management.
- Open the locking mechanism.

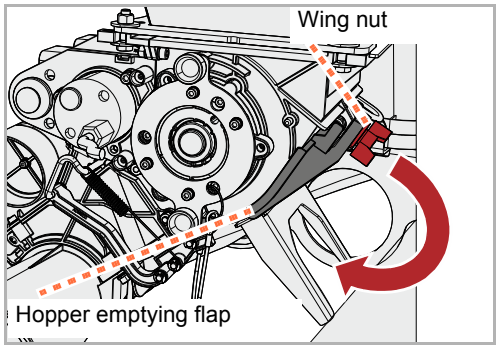




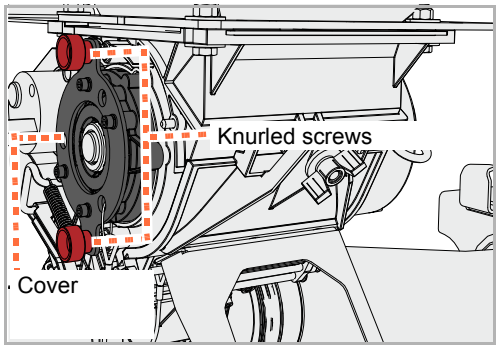
- On the metering device, open the flap for the calibration test.



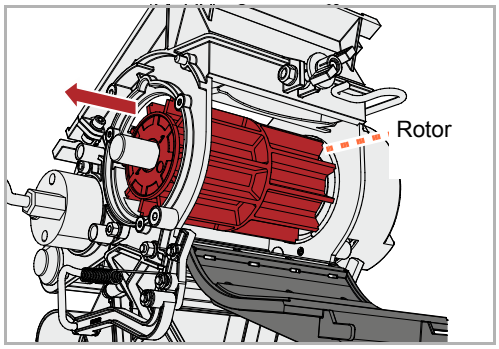
- Press and hold the key on the metering device for at least 3 s and then hold it pressed. The metering device starts and the seed falls into the catch pan.
- Completely empty the metering device.
- Release the key. Metering device stops.



- Close the flap for the calibration test.
- Loosen the wing nut on the metering device's emptying flap and fold it upwards.
- Open the hopper emptying flap.

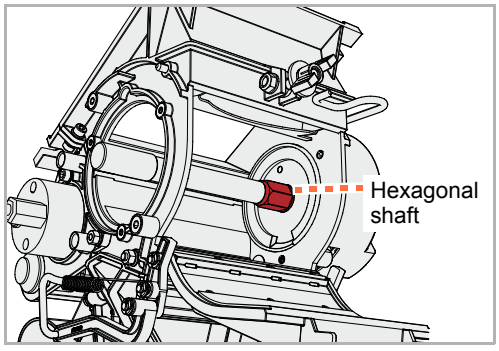


- Release the knurled screw on the cover.
- Remove the cover. The cover is secured by means of a cable.

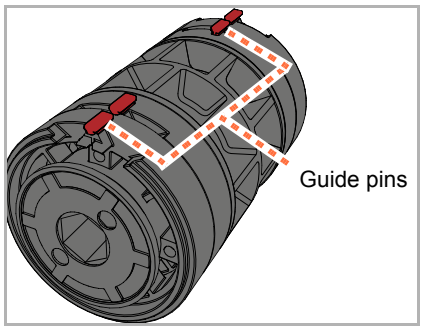


- Gently turn the rotor back and forth and remove it.

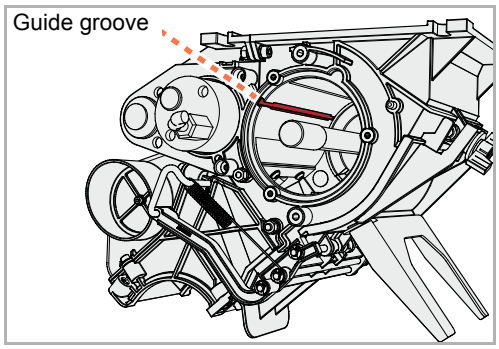
Install



- Using the software, choose the selected rotor with the appropriate number.
- Slide the rotor onto the hexagonal shaft by turning it slightly.

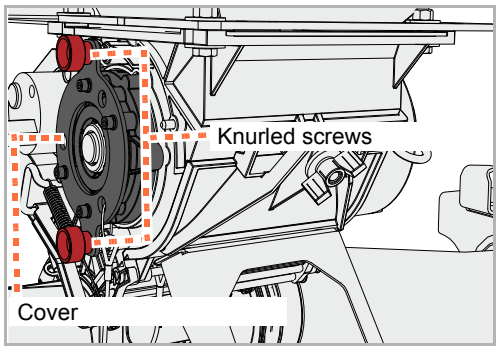


Guide pins located on rotors 3 to 5 must be inserted into a guide groove in the metering housing.

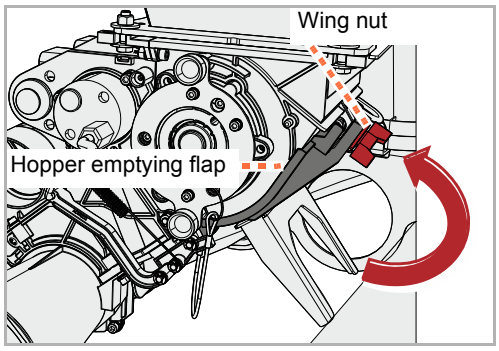


Installing rotors 3 to 5:

- Carefully slide the rotor into the guide groove and onto the hexagonal shaft.



- Refit the cover and secure it using knurled screws.



- Close the emptying flap and secure it with the wing nut.

Check the position of the seal
Make sure that the seal is positioned correctly in the emptying flap. The overpressure in the hopper must not be able to escape here. *Pressure losses may lead to incorrect metering.*

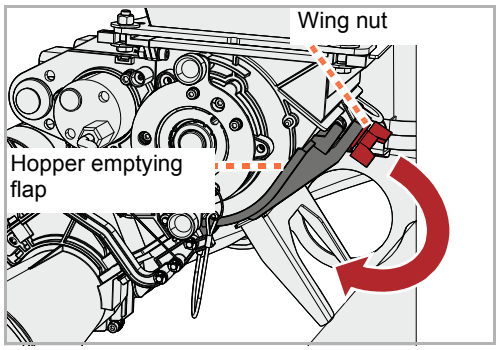
Auxiliary plate

The auxiliary plate is located in the metering housing. It cannot be seen from the outside. The software gathers information about whether the auxiliary plate is to be installed or removed.

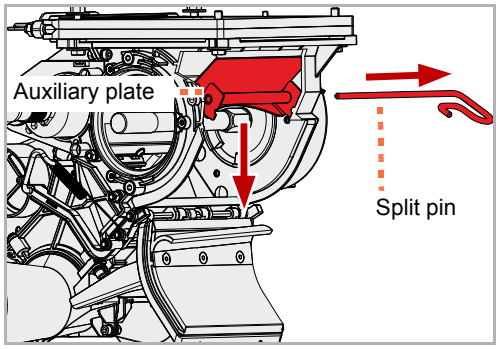
Depending on the seed, it may be necessary to fit the auxiliary plate. The auxiliary plate prevents the drive motor from being overloaded.

The auxiliary plate can only be removed once the rotor has been removed.
→ Chapter »Preparation for sowing«, section »Rotor«, page 81

Removal



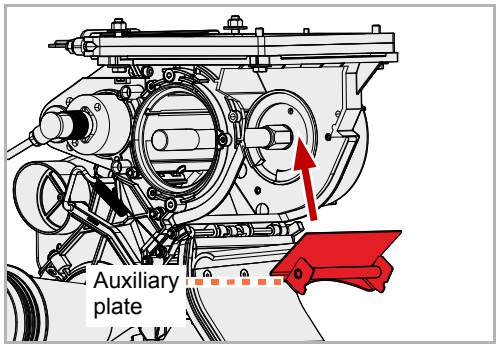
- Loosen the wing nut on the metering device's emptying flap and fold it upwards.
- Open the hopper emptying flap.



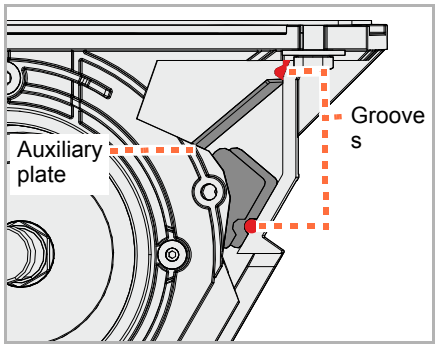
- Pull out the split pin.
- Remove the auxiliary plate.
- Insert the split pin.
- Close the emptying flap.

Install

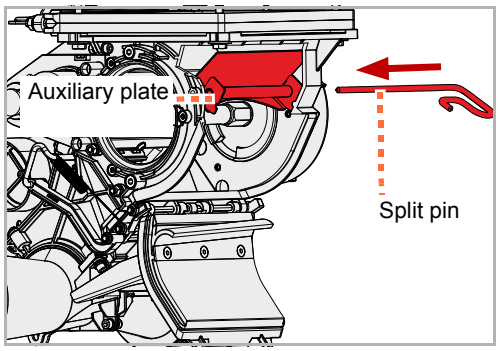
The auxiliary plate can only be installed once the rotor has been removed.
→ Chapter »Preparation for sowing«, section »Rotor«, page 81



- Open the hopper emptying flap.
- Pull out the split pin.
- Insert the auxiliary plate.

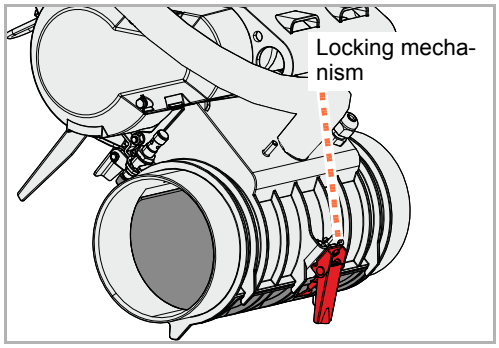


- There are grooves in the metering housing. For the correct installation, place the auxiliary plate correctly into the grooves.

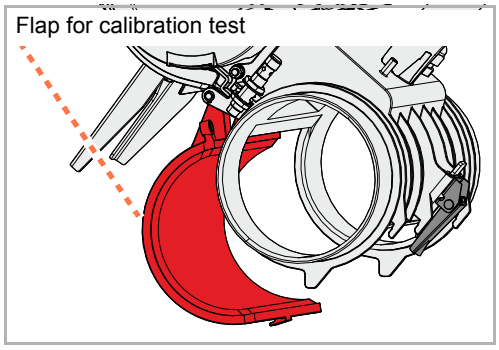


- Insert the split pin and use it to fasten the auxiliary plate.
- Insert the rotor.
- Fit the cover and secure it using knurled screws.
- Close the emptying flap.

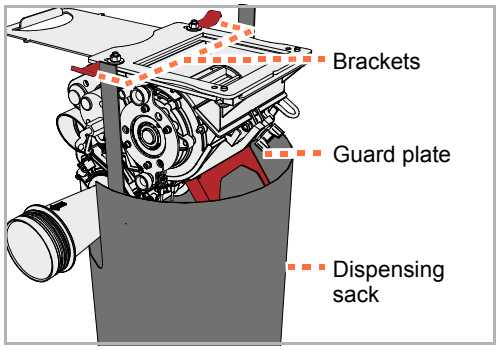
Calibration test



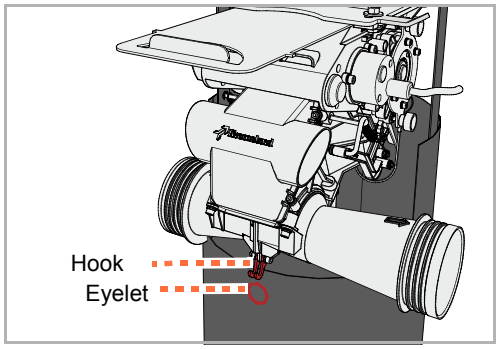
- Open the locking mechanism.



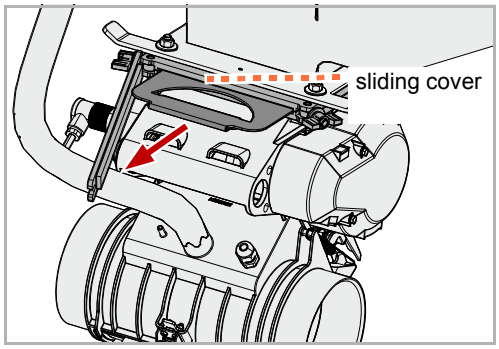
- On the metering device, open the flap for the calibration test.



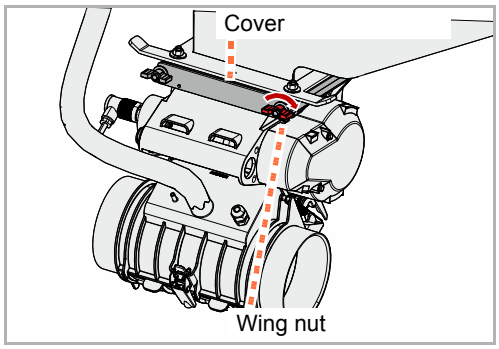
- Pull the dispensing sack over the guard plate and attach it to the holders using the loops.



- Hook the eyelet on the dispensing sack into the tick on the metering device.



- Open the sliding cover on the metering device. The seed can once again flow from the seed hopper into the metering device.
- Store the sliding cover in the tool case.



- Close the cover and secure it with the wing nut.

Start via software

You can either use the terminal to start the calibration test, or start it manually at the metering device itself.

→ Operating manual for the software, section »Other applicable documents«, page 5

Manual start

You can start the metering device manually. A key is located directly on the metering device.



- Press the key. The metering device starts.

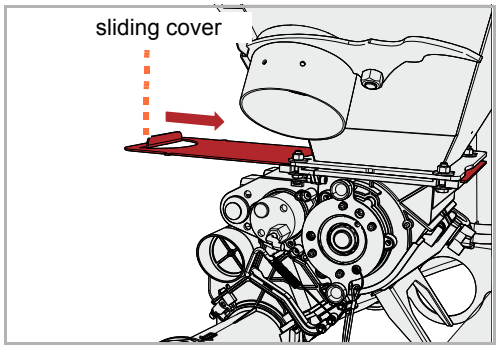
Pause	Press the key again
End pause	Press the key again

After the calibration test, weigh any collected seed or fertiliser and enter the result in the software.

→ Operating manual for the software, section »Other applicable documents«, page 5
→ Supplied electronic scales, section »Electronic scales«, page 90

Work stoppage

For longer work stoppages, for example when starting seeding work on the next day:



- Close the sliding cover on the metering device. No more seed can flow from the seed hopper into the metering device.
- Empty the metering device and remove the rotor.

→ Empty the metering device, chapter »Operation«, section »Emptying the metering device«, page 121

Electronic scales

The machine is supplied with electronic scales, which are provided for the purpose of weighing the seed or fertiliser for the calibration test. Observe the tolerances and weighing range. The scales are not suitable for weighing fine seed such as rape.



Technical specifications

Storage temperature	-25 – +50 °C
Operating temperature	0 – +40 °C
Maximum length	19 cm
Maximum width	6.5 cm
Weight	200g
Battery	2x CR2032, 3 V
Weighing range	400 g–50 kg
Tolerance	20 kg/20 g
	30 kg/20 g
	50 kg/50 g

The scales cannot be calibrated and are not subject to compulsory calibration. Therefore, they must not be used for the sale of goods by weight.

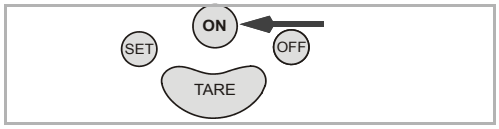
Weighing the calibration test

Observe the load-bearing capacity
When suspending the weight from the scales or fastening the scales to the handle, ensure that the means of fastening have sufficient load-bearing capacity. Do not exceed a weight of roughly 50 kg.
Injuries can occur if the weight breaks off.

Replace the battery in good time
If a prompt to change the battery is indicated on the display, the battery must be replaced.
Empty batteries can leak, cause health impairments and damage the device.

Observe the range of use
The scales are envisaged only for the weighing of goods within the specified weighing range.
Deviations from the actual weight can occur within the specified tolerances.

Switching on

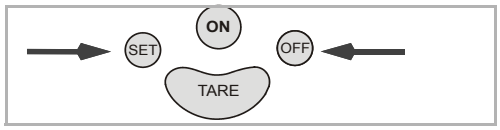


- Hold the implement vertical.
- Press the "ON" key.

The scales are calibrated and ready to operate if “0.00 kg”, “0.0 lb” or “0 oz” is displayed.

Adjusting

You can switch the weight display from kg to lbs or oz. The conversion is retained after switching off.



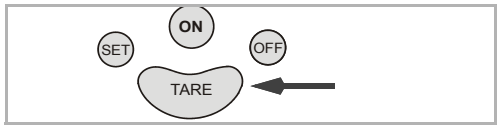
- Press the "SET" key until the required unit appears in the display.
- Press the "OFF" key.

The next time the device is switched on the unit required is displayed.

By pressing and holding the "SET" key, you can display the temperature in °C.

Tare setting

Tare is required if you want to weigh just the content without the hopper.



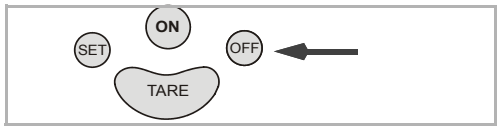
- Suspend the hopper from the weighing hook and wait until an arrow appears at the bottom of the display.
- Press the "TARE" key.

- Suspend the weight from the weighing hook and wait until an arrow appears at the bottom of the display.

The weight is displayed.

If tare is set, the value set is automatically deducted, i.e. the weight without the hopper is displayed.

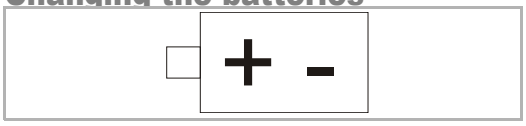
Switch off



- Press the "OFF" key.

After roughly 60 seconds of no activity, the device switches off automatically.

Changing the batteries



The device indicates when the batteries are low. You must then replace the batteries. Battery type CR2032, 3 V.. Take any used batteries to a special disposal point for batteries. Under no circumstances should you put them in the normal household waste.

- Open the battery compartment with the Phillips screwdriver.
- Remove the batteries, taking careful note of the installation position.
- Insert the new batteries, ensuring the correct installation position.

Safety

Before transporting the machine on public roads, read the following safety instructions. Compliance will help you to avoid accidents.

General

Ensure that the condition of the machine conforms to traffic regulations

The machine must conform to current road traffic regulations if you intend to drive with it on public roads. This includes, for example:

- Lighting, warning and protective devices must be fitted
- With the machine folded, all brake, reversing, and turn indicator lights as well as the number plate must be clearly visible. If a clear view is not possible, the lighting equipment and the number plate must be fitted to the attached seeding technology.
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- Transport with a full hopper is not permitted. You may only carry the previously calculated load.

→ Possible load: Chapter »Familiarising yourself with the machine«, section »Technical specifications«, page 28

- The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
- Close the hopper with the cover

The driver and keeper of the vehicle are liable should the road traffic regulations not be observed.

Prior to road transport



Remove soiling
Remove crop residue, stones or clods of earth.
During road transport, these foreign bodies can fall off the machine and cause accidents.

Switch off the electronic control system
Prior to road transport, you must switch off the electronic control system.
Otherwise, activating functions in the electronic control system by mistake may cause the machine to move. This can result in damage to the machine or accidents.

Close the ball valves
If there are ball valves on the hydraulic lines or chassis cylinders, the ball valves must be closed for driving on the road.
Otherwise, accidental actuation of control units in the tractor could trigger machine movements. This can result in damage to the machine or accidents.

Securing the track markers
Mechanical securing mechanisms are located on the track markers. The mechanical securing mechanisms prevent the undesirable folding out of the track markers.
Accidents may result from the folding out of track markers while travelling by road.

Check the lighting equipment for road transport
The lighting equipment for road transport must be clean and in good working order.
Dirty or faulty lighting equipment for road transport may lead to serious accidents.



Observe transport width
Observe permissible transport widths and, if necessary, fold the machine into the transport position and lock it securely, install lighting equipment, alarms, and protective devices. The driver and owner of the vehicle are liable if road traffic regulations are not observed.
Failure to comply with these instructions may result in accidents or damage to the machine.

Observe steering capability
The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
Reduced steering capability can lead to accidents.

Check locking mechanisms
Check all locks for firm seating. Loose locking mechanisms can open during road transport and cause unintended reactions of the machine,
This can result in damage to the machine or accidents.

Trip ropes must hang loose
Trip ropes for quick-release couplings must hang loose and must not, when in their lowered position, release the couplings of their own accord.
Unintended tripping can cause serious accidents.

Comply with permissible axle loads
Road transport must only take place up to the maximum permissible axle load of the machine.
A filled seed hopper or fertiliser hopper influences the driving performance of the machine if overloaded and can cause accidents during road transport.
→ Maximum permissible weights: Chapter »Familiarising yourself with the machine«, section »Technical specifications«, page 28

Observe the maximum permissible total weight
Road transport must only be undertaken with up to the maximum permissible total weight of the machine.
A filled seed hopper or fertiliser hopper influences the driving performance of the machine if overloaded and can cause accidents during road transport.
→ Maximum permissible total weight: Chapter »Technical specifications«, Section »Technical specifications«, Page 28

Checking brake lines
Check all brake lines for proper connection.
Incorrectly connected brake lines can result in serious accidents.

Checking the brake linkage
Check that the brake linkage has been set correctly.
An incorrectly set brake linkage may lead to serious accidents.

Check the tyre pressure of the transport wheels
Check the tyre pressure of the transport wheels before road transport.
Incorrect tyre pressure can cause serious accidents.

Stow away the wheel chocks
Stow away the wheel chocks in the holder and let the safety yoke engage at the wheel chocks.
During road transport, serious accidents can result if the wheel chocks fall off.

Tractors with articulated steering or a crawler chassis

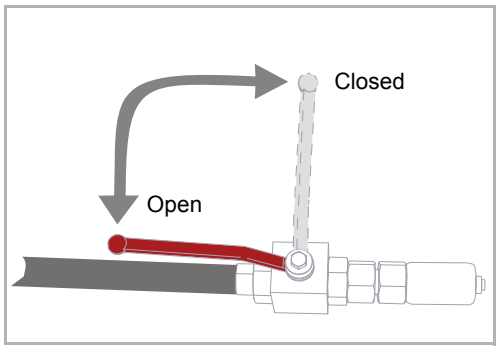
Locking the lower link balls
Set the lower link balls for road transport so that the machine has no play to the left or right
If the lower link balls have play on the left and right, this could cause a critical driving situation or accidents.

Transport position

If the machine is in the work position, the machine must be lifted and folded in to the transport position.

Ball valve

Depending on the version, ball valves are provided on the hydraulic lines.

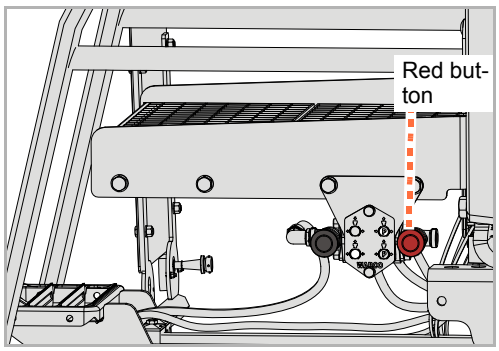


- Open the ball valve.
- Using the control unit on the tractor, fold the machine into its transport position.
- Close the ball valve.

Manual brake

Before driving on the road, check whether the machine has been braked manually. The manual braking effect must be cancelled.

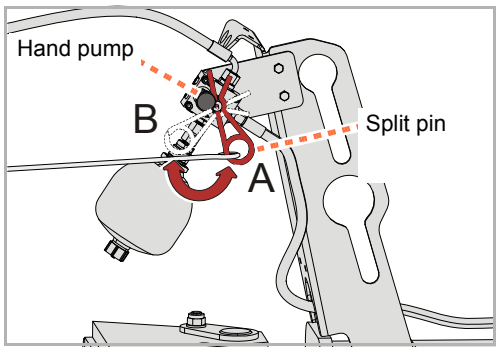
Air pressure brake system



Cancelling the manual braking effect:

- Pull out the red button.

Hydraulic brake system



Cancelling the manual braking effect

- Move the split pin to position "A".
- Actuate the hand pump until the braking effect has been cancelled.

Braking effect

The braking effect can be adjusted to the condition of the machine. As the operator, you are responsible for selecting the correct braking effect.

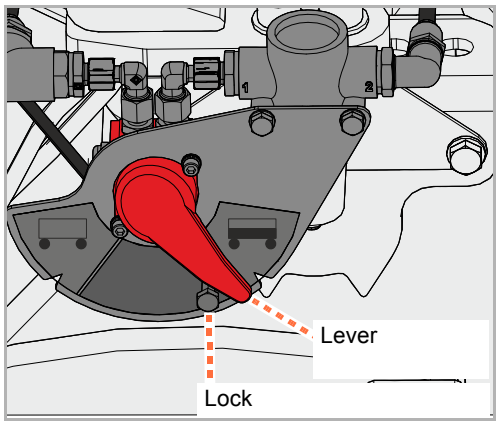
Set the braking effect correctly
Select the braking effect according to how full the machine is. A braking effect that is too low or too high may have a negative influence on the behaviour of the machine.

- Braking effect too low: The tractor/machine combination takes longer to stop than expected.
- Braking effect too high: The wheels of the machine jam and the machine may become uncontrollable.

This can result in accidents.

Machine with low empty weight

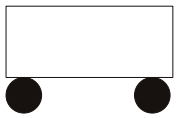
Machines with a low empty weight are not fitted with a lock and the braking effect must be adjusted to how full the machine is.



▸ Use the lever to select the braking effect and lock the locking mechanism.

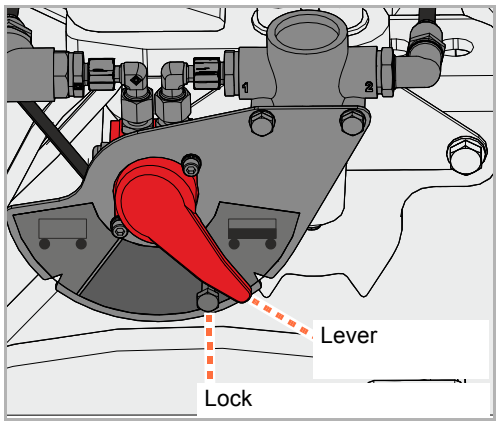
There is an identification near the lever.

Meaning of the symbols:

Position of the lever	Meaning	Use	
		For road transport	On the field
	Low braking effect	When hopper is empty	When hopper is empty
	High braking effect	When the hopper is partially filled and the maximum permissible axle load is being observed	When hopper is full or half full

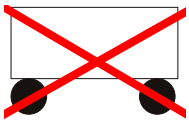
Machine with high empty weight

Machines with a high empty weight are fitted with a lock and the braking effect on these machines does not need to be adjusted.

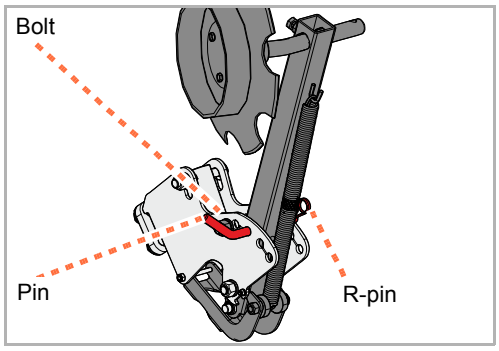


There is an identification near the lever.

Meaning of the symbols:

Position of the lever	Meaning	Use	
		For road transport	On the field
	Low braking effect	This position is locked. Manipulating the components to use this position is prohibited.	
	High braking effect	When the hopper is empty to partially filled and the maximum permissible axle load is being observed	When the hopper is empty to full

Pre-emergence marker [+]



The pre-emergence marker must be folded up and secured for transport.

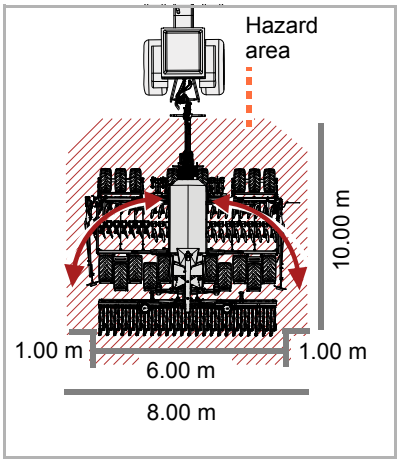
- Remove the pin.
- Fold up the pre-emergence marker against the bolt.
- Insert the pins and secure them with safety splints.

Do not remove the bolt
Do not remove the bolt that limits the pre-emergence marker's slewing range.
Removing the bolt may lead to damage to the machine in the area of the lighting equipment.

Folding in

Folding in is accomplished in two stages:

- Lift the tools
- Fold in the side sections



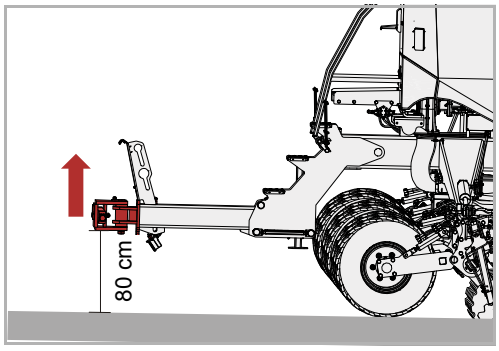
No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.

Observe the machine when folding
Observe the machine while folding in or folding out.
If machine behaviour is unusual when folding the machine in or out, interrupt the folding operation immediately and determine the cause.
This will prevent damage to the machine.

The folding process is controlled by the electronic control system.
→ Operating manual for the software, section »Other applicable documents«, page 5

- After folding, actuate the control unit on the tractor for a further 3 seconds. Whilst the control unit is active, deselect folding on the terminal.

Ground clearance



- Set the lower link ball on the tractor in such a way that the ground clearance is 80 cm.

This distance ensures that the transport wheels have sufficient contact with the surface and that the brakes can work correctly.

Tractors with articulated steering or a crawler chassis

- Set the lower link balls for road transport so that the machine has no play to the left or right.

Road transport



Lock the control units
Lock all control units on the tractor when driving on the road and close the shut-off valves on the hydraulic couplings.
Accidentally actuated control units can cause accidents.

Attach the securing cable to the tractor
With hydraulic brake systems, the securing cable must be secured to the manual brake and to the tractor. If the machine becomes separated from the tractor, the cable forcibly brakes the machine.
Road transport without securing cable is prohibited.

Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

Observe the maximum speed
Do not exceed the maximum permissible driving speed during transport.
Higher driving speeds may cause accidents.
→ Maximum permissible driving speed: Chapter »Familiarising yourself with the machine«, section »Technical specifications«, page 28

Adapted driving speed
Always adapt the driving speed to the ambient conditions.
An excessive driving speed, on uneven terrain for example, can result in damage to the machine or accidents.

No sudden load changes
Avoid sudden load changes. Sudden load changes result from sudden movements to the right or left.
Sudden load changes can cause accidents.

Ensure clear visibility
Check the immediate vicinity before driving off. Always make sure that you have a clear field of vision and, in particular, look out for children within the operating area of the machine.
Persons who could be struck when the machine starts up can be seriously or fatally injured.

Before travelling on the road, check the following in particular:

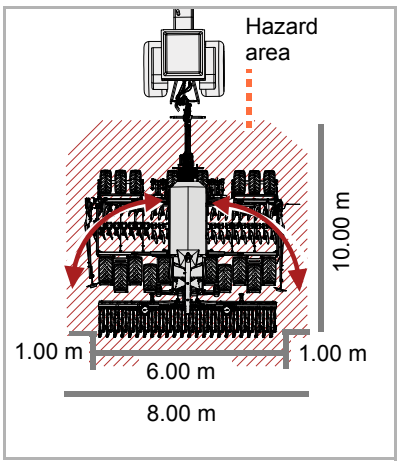
- ☑ When hitching to the lower link balls, these are locked against sideways movement
- ☑ The side sections are folded in and secured
- ☑ The track markers are folded in
- ☑ The filling auger is in the transport position
- ☑ The chassis and support wheels are in the transport position and secured against unintended activation
- ☑ The steps and control platform are folded up
- ☑ The support leg is in its transport position
- ☑ The machine is correctly aligned with ground level
- ☑ The emptying flaps on the metering devices and hoppers are closed
- ☑ The lighting equipment and warning signs are attached and operational
- ☑ All safeguards for parts that might be a traffic hazard have been attached
- ☑ All functions of the software are not active
- ☑ The operating terminal is deactivated
- ☑ The permissible load in the seed hopper and fertiliser hopper has not been exceeded
- ☑ The permissible axle load and permissible supporting load have been adhered to
- ☑ The machine is secured with wheel chocks when parking on public roads
- ☑ Brake hoses are connected and the brakes are operational
- ☑ The braking effect is correctly adjusted

Tractors with articulated steering or a crawler chassis

- ☑ Set the lower link balls for road transport so that the machine has no play to the left or right

Folding out

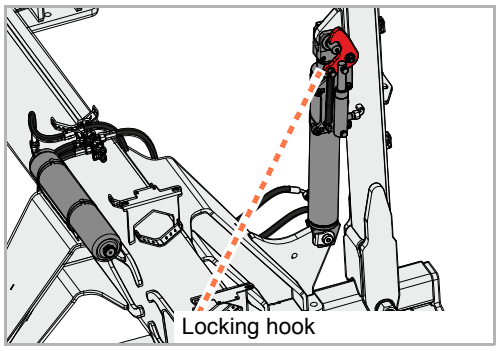
The side sections are folded out when the machine is folded out. The tools remain in a lifted position after the machine is folded out. The machine can be moved on the field in this position.



No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.

Observe the machine when folding
Observe the machine while folding in or folding out.
If machine behaviour is unusual when folding the machine in or out, interrupt the folding operation immediately and determine the cause.
This will prevent damage to the machine.

The folding-in process is controlled by the electronic control system.
→ Operating manual for the software, section »Other applicable documents«, page 5



- Fold the machine in again first so that the locking hook is loosened.
- Fold out the machine.

Hitch

Tractors with articulated steering or a crawler chassis

- Set the lower link balls for working in the field so that the machine has play to the left and right.

Seed hopper



Using steps
Only use the steps supplied to climb onto the maintenance platform. The platform is only intended for observing the loading process.
Climbing onto the platform without using the steps can cause accidents.

Use the railing
Use only the steps supplied and the railing to climb onto the hopper's maintenance platform. The platform is only intended for observing the loading process.
Climbing onto the platform without using the steps and railing can cause accidents.



Remove seed
Remove all seed residue from the hopper when changing seed types.
Remaining seed can contaminate the new seed.

Changing seed types

Before adding a different seed type to the seed hopper, remove all old seed residue from:

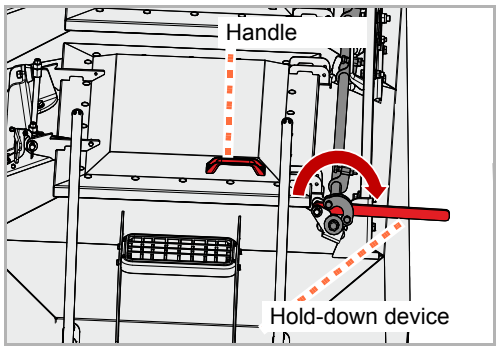
- Seed hopper
- Metering device

→ Chapter »Sowing«, section »After sowing«, page 121

Before filling with another seed type, close the metering device flaps again.

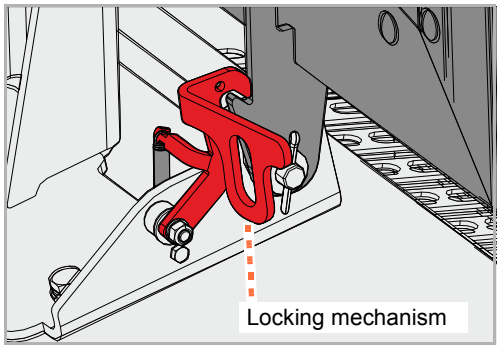
Before filling

Front hopper



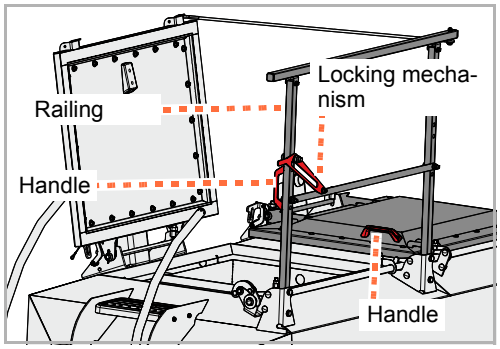
To fill the front hopper, open the cover.

- Open the hold-down device.
- Open the front cover using the handle.



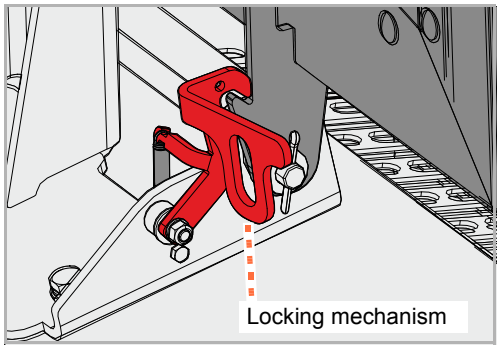
- Correctly secure the locking mechanism on the cover.
- Fill the front hopper.

Rear hopper



To fill the rear hopper, raise the railing and open the cover.

- Raise the railing using the handle.
- Correctly secure the locking mechanism on the railing.
- Open the rear cover using the handle.



- Correctly secure the locking mechanism on the cover.
- Fill the rear hopper

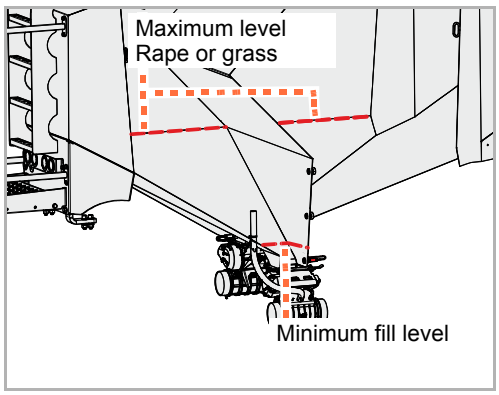
Filling

No manual filling
Do not carry any loads when climbing onto the machine as you have to hold on with both hands.
Climbing on without the ladder or with a load can cause accidents.

Observe maximum fill level
The maximum fill level depends on the seed. Observe the maximum fill level. Only fill rape and grass to the top of the partition between the chambers of the metering device.
If the max. fill level is exceeded, this can result in patchy seeding.

- Minimum seed hopper fill level:

For grain	30 cm above the base of the seed hopper
For rape or grass	5 cm above the base of the seed hopper



- Maximum seed hopper fill level:

For grain	Top edge of the seed hopper
For rape or grass	Top of partition between chambers in metering devices

You can set the height of the sensor for the level indicator in the seed hopper. At low application rates that do not cover the level indicator at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".
→ Operating manual for the software, section »Other applicable documents«, page 5

Big Bag

Please take particular care when filling with a Big Bag. The load can sway; even standing underneath the lifted Big Bag is dangerous.



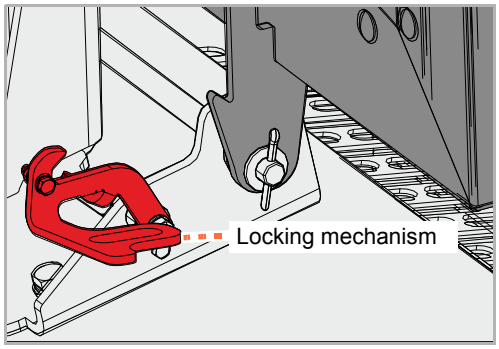
Do not stand underneath or next to Big Bags when they are lifted
Standing under or near lifted Big Bags is dangerous. Maintain a sufficient distance and observe the behaviour of the load.
By swinging, the Big Bag could hit people and cause them to fall. This could result in injuries.

- Fill the seed hopper in the normal manner. Note the fill level.

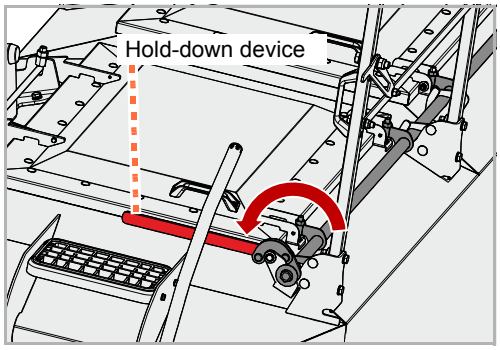
After filling

The covers protect the seed and fertiliser from wind and rain. During sowing, the covers must always be closed to keep dust and humidity away from the seed and to guarantee overpressure in the hoppers.

After filling the hopper, close the cover and fold the railing down.

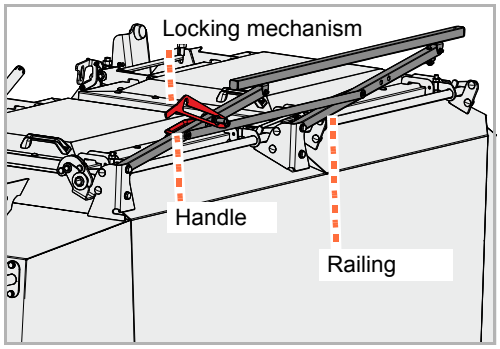


- Open the locking mechanism on the rear hopper.
- Close the cover.
- Open the locking mechanism on the front hopper.
- Close the cover.



- Close the hold-down device.

Close the cover
Close both the covers before sowing in order to build up overpressure in the hopper.
If the covers are not closed it may lead to incorrect metering.



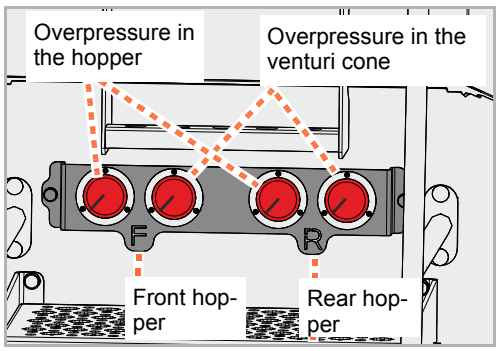
- Open the locking mechanism.
- Unfold down the railing.

Hopper with overpressure

For the seeding, an overpressure builds up inside the hopper. To avoid overpressure escaping, the covers must be closed.

Pressure display

The overpressure inside the front hopper and the rear hopper and on the associated venturi cone is displayed via the manometer.



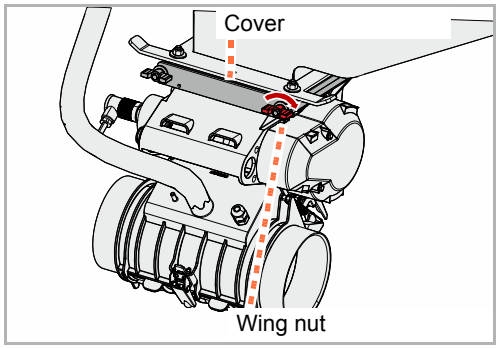
The difference between the overpressure levels within the hopper and on the accompanying venturi cones must not exceed 5 mbar.

The overpressure for one hopper may differ significantly from that of the other hopper, particularly if the air stream is reduced for applying the seed.

Close the cover
Close both the covers before sowing in order to build up overpressure in the hopper.
If the covers are not closed it may lead to incorrect metering.

Leaktightness test on the sliding cover

The cover on the slit for the sliding cover must have a tight seal to prevent pressure from being lost here.



- Switch on the fan.
- Check the area around the cover for leaks. If required, re-tighten the wing bolt.

Setting Work

Deposit depth

The setting for the sowing depth depends on a wide range of factors. The depth can be different for various soil conditions with the same settings on the machine. The field always needs to be checked.

The deposit depth is set using the terminal.

→ Operating manual for the software, section »Other applicable documents«, page 5

Coulter pressure

You can use the hydraulic coulter pressure to determine the force with which the seed coulter and the press wheels are pressed onto the ground.

The coulter pressure that is to be selected depends on the soil type and the soil condition. Use the following table for this:

If the ground is slightly dry	Low coulter pressure
If the ground is very wet	High coulter pressure

Set the coulter pressure:

- ▸ Move the machine into the work position when it is in the field.
- • Use the electronic control system to preselect the coulter pressure setting

→ Operating manual for the software, section »Other applicable documents«, page 5

- ▸ Use the tractor's control device to increase or reduce the hydraulic pressure as required.



- ▸ The coulter pressure is shown as symbols on the monitor.

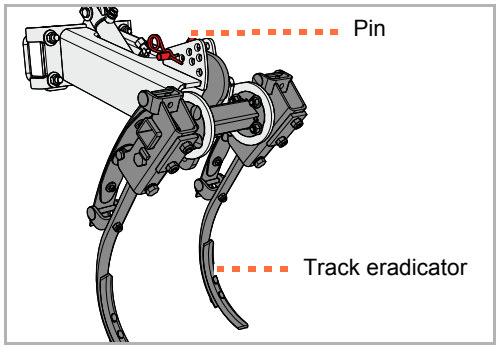
→ Operating manual for the software, section »Other applicable documents«, page 5

- ▸ Set the electronic control system back to the standard setting.

Track eradicator [+]

You can set the working depth of the track eradicator to loosen the tracks from the transport wheels.

Setting of the working depth

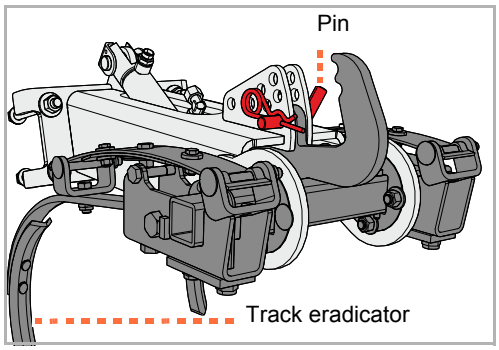


Make identical changes to all brackets:

- Lift the machine.
- Remove split pin from pin.
- Remove the pin and insert it into the new position in the regulating piece.
- Secure the pin with a split pin.

Track eradicator not working

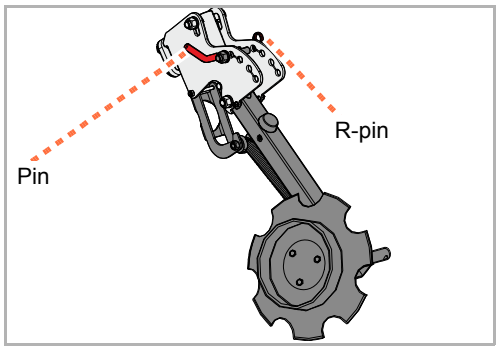
If it is not necessary to loosen the marks, you can lift the track eradicator.



Make identical settings for all brackets:

- Lift the machine.
- Remove split pin from pin.
- Remove the pin and insert it into position in the regulating piece as shown.
- Secure the pin with a split pin.

Pre-emergence marker [+]



The pre-emergence marker must be folded down into its work position.

- Remove the pin.
- Unfold the pre-emergence marker.
- Insert the pin into the free hole and secure it with R-pins.

Checks

Before sowing

Carry out the inspection using the checklist:

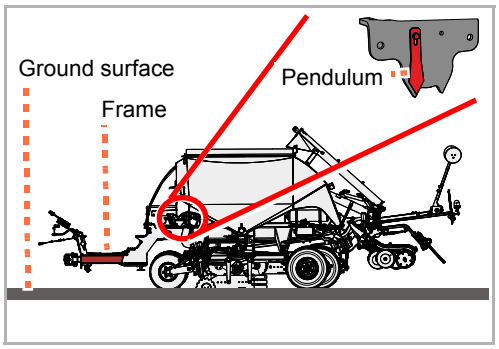
- ☑ Have all the connections been checked?
- ☑ Are both covers on the hoppers closed?
- ☑ Is the railing unfolded?
- ☑ Is the electronic control system working correctly?
- ☑ Have all counters been reset to zero before the first operation?
- ☑ Has the correct tramline rhythm been set?
- ☑ Are the shut-off valves OK and is the track width of the spraying/ fertilising tractor set?
- ☑ Correct reduction head in the main distributor?
- ☑ Half-width shut-off properly set?
- ☑ Application rate set?
- ☑ Are the emptying flaps closed?
- ☑ Flap for the calibration test closed?
- ☑ Seed hoses checked for tangles or kinks?
- ☑ Coulters and seed pipes checked for clogging?
- ☑ Are the track markers set and folded out?
- ☑ Track eradicator activated?
- ☑ Pre-emergence marker activated?

Test drive

Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

Check the immediate vicinity
Before driving off, folding out, and operating the machine, check its immediate vicinity. Ensure sufficient visibility. Do not begin work until the immediate vicinity is cleared of any persons or objects.
Any use of the machine without first checking the surrounding area can cause accidents.

After completing all preparatory work, take a test drive. During cultivation, the frame should be parallel to the ground. The pendulum displays the correct alignment.
→ Chapter »Work preparations for soil preparation«, section »Tools for the soil preparation«, page 52



- Lower the tools to the work position.
- After lowering the tools, actuate the control unit on the tractor for approx. 4 more seconds. This is how you achieve the required pressure on the side sections.

→ Operating manual for the software, section »Other applicable documents«, page 5

Performing the test drive

- First perform a test drive in work position at working speed (10–12 km/h).
- Adjust the soil preparation tools, if necessary.

Perform the test drive, without sowing, over a typical section of the field. The headland or areas with obstacles are not suited for the test drive.

After the test drive

After the test drive, verify that the seeding is done at the proper sowing distance, deposit depth and with correct soil coverage. Readjust if necessary to take soil conditions into account:

- Seed deposit depth

→ Operating manual for the software, section »Other applicable documents«, page 5

- Adjusting the seed-covering harrow

→ Chapter »Preparation for sowing«, section »Track marker«, page 60



Do not remove the protective devices
The protective equipment must not be removed or by-passed. Check all protective devices before starting the machine.
Unprotected machine parts can cause serious or fatal injury.

Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

Check the immediate vicinity
Before driving off, folding out, and operating the machine, check its immediate vicinity. Ensure sufficient visibility. Do not begin work until the immediate vicinity is cleared of any persons or objects.
Any use of the machine without first checking the surrounding area can cause accidents.

Height of machine and overhead power lines
If a height of 4.00 m is exceeded when folding the machine in and out, the machine must not be folded in the vicinity of conducting overhead power lines! Danger of electrocution!
Should the machine come into contact with a live overhead power line:

- Do not attempt to exit the tractor cabin
- Do not touch any metal parts on the tractor
- Ensure that there is no conductive contact with the ground
- Warn all persons in the area not to approach the tractor or the machine
- Wait for help from professional emergency service personnel as power in the overhead line must first be switched off

Never climb onto the machine beneath live overhead power lines.
Electrocution does not require direct contact.



Switch on the alarm for fan speed
When sowing using the software, always switch on the "RPM" alarm.
Otherwise, the metering device may start while the fan drive is switched off..

Sowing

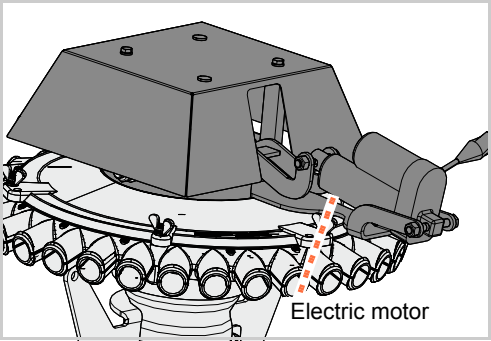
Folding the side sections and the track markers in and out, as well as the headland, work, and transport positions for the machine are described in detail in the »Hydraulic system« chapter.

During sowing, access the required information from the electronic control system.

Before each sowing, check the input values via the electronic control system.

Sowing with half working width

For even and symmetrical rhythms, e.g. 4S or 6S, sowing with half working width is required at the start of the field.



The electrical half-width shut-off disconnects the machine on the left-hand side from the seed supply. Seed is then only applied on the right-hand side of the machine.

The software controls the electrical half-width shut-off.
→ Operating manual for the software, section »Other applicable documents«, page 5

Work position and cultivation

- Switch on the terminal.
- Fold the machine into its work position.

→ Chapter »Hydraulic system«, section »Lifting or lowering«, page 39

- After lowering the tools, actuate the control unit on the tractor for approx. 4 more seconds. This is how you achieve the required pressure on the side sections.
- Switch on the fan.
- Begin seeding work.

Electronic control system
As soon as the metering device is driven, the electronic control system automatically shows the desired information. Depending on the control system, the display will show:

- The current application rate [kg/ha]
- The current driving speed information
- All information shown in relation to the rate of work
- Details about the speed and rotor

Working speed

During sowing, monitor the working speed. The possible working speed within the range of 10 – 15 km/h depends on the soil type and soil preparation.

Where the soil is loose and the working speed is too high, the front seed rows can easily be covered by too much soil by the rear coulters. Drive a bit slower or change the sowing depth.

Working lights [+]



Avoiding dazzle
The working lights may also dazzle traffic in the distance. Also be aware of traffic near the field when using the working lights.
Dazzling other vehicles may cause accidents.

- Switch on the work lights via the electronic control system

Track marker

Unintentionally lifting a track marker arm, e.g. to avoid obstacles, interrupts the metering device drive.

When lifting the machine, the track marker arm must be folded in as far as possible. This automatically switches the control block to the other track marker.

- Make the necessary settings on the software if there are obstacles

→ Operating manual for the software, section »Other applicable documents«, page 5

When the track marker arm is again lowered to the work position, the metering device drive automatically restarts.

Turning

When turning, the transport wheels stay on the ground and the implements are lifted.

- Throttle the engine back just before reaching the field edge and raise the seeding machine while still driving.
- After the turn, lower the seeding machine whilst travelling approximately 5 m ahead of the desired seeding start.
- The seed needs time to travel from the metering device to the seed coulters. As a result, the machine does not sow directly after lowering. The information in metres relates to an average speed. If you drive very fast before the desired seeding start, you must lower the machine earlier. If you drive very slowly before the desired seeding start, you must lower the machine later. Check the seeding start after the first passes and correct the timing of lowering.

Electronic control system
At the headland the tramline rhythm is advanced one sequence.

This position remains in memory even if the power is switched off. After power supply has been re-established, continue sowing with the same settings.

When lifting or lowering, the tractor control unit must remain activated for a few more seconds. Several functions have been combined, and must be performed by the machine alone, e.g. changing the track marker.

Checks during sowing

During sowing, use the checklist to examine the following:

☑ Does the fan speed remain constant during sowing?

From time-to-time, climb down and check the following:

☑ Sowing depth OK?

☑ Are all coulters unobstructed?

☑ Are the shut-off valves switching properly?

☑ Is the seed flowing freely through the shut-off valves?

☑ For rape:
Is the seed flow still OK?

☑ Because of the tendency of glutinous seed to bridge:
Is the seed flow still OK?

☑ Is the seed sufficiently covered with soil?

☑ Is the S-tine harrow or the finger-tine harrow working as required?

After sowing

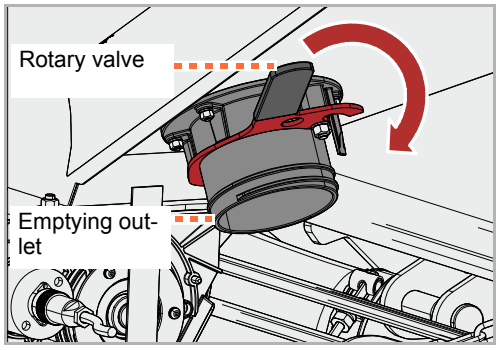
After sowing:

- Shutting the machine down
- Empty the seed hopper
- Emptying the metering device

Parking the machine

- Switch off the hydraulic fan drive.
- Park the tractor and machine on even ground.
- Bring the machine into the transport position.

Emptying the seed hopper

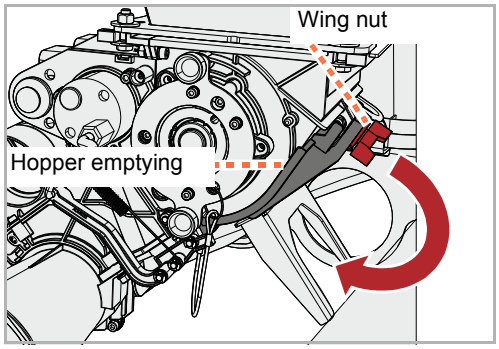


- Place a catch pan under seed hopper.
- Turn the hose onto the emptying outlet.
- Open the rotary valve on the seed hopper.
- Catch the seed.
- Close the rotary valve on the seed hopper.

Emptying the metering device

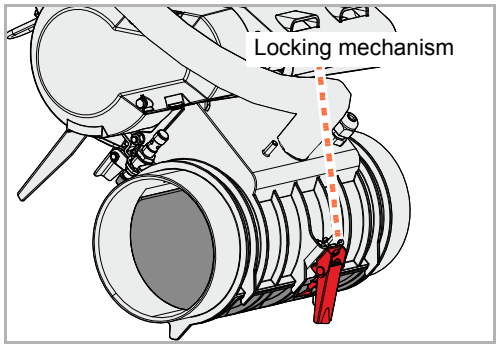
After emptying the seed hooper, there is seed in the metering device again. The metering device must be emptied when a seed change takes place or the machine is being parked up.

If the catch pan is sufficiently large to pick up the rest of the seed, you can empty the metering device over the emptying flap. However, the flap cannot be closed against the force of the seed running out.

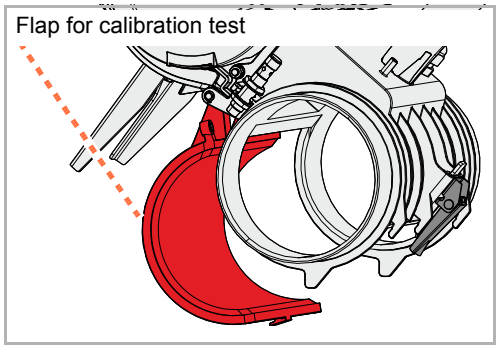


- Place a catch pan under the metering device.
- Loosen the wing nut and fold it upwards.
- Open the emptying flap and let the seed flow out.

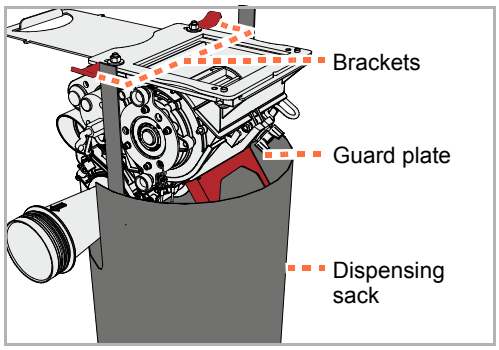
Controlled emptying of the metering device:
To check the seed flow out of the metering device more thoroughly, proceed as you would in a calibration test.



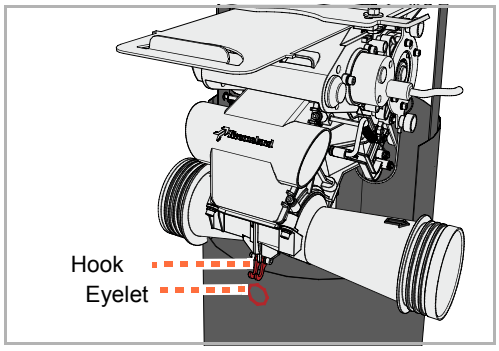
- Open the locking mechanism.



- On the metering device, open the flap for the calibration test.

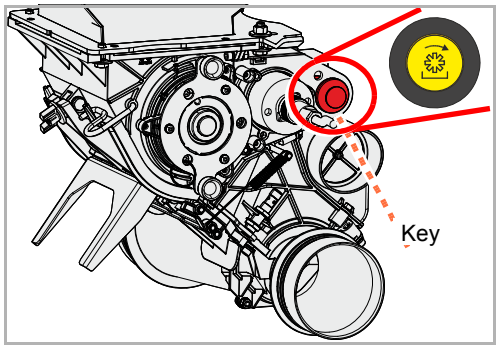


- Pull the dispensing sack over the guard plate and attach it to the holders using the loops.

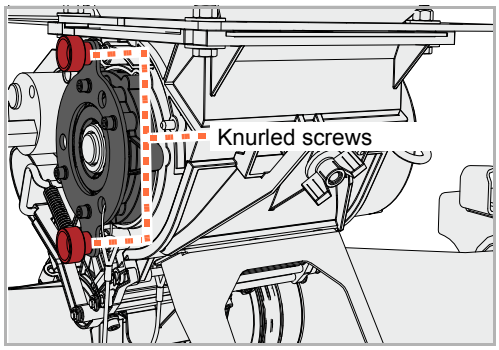


- Hook the eyelet on the dispensing sack into the tick on the metering device.

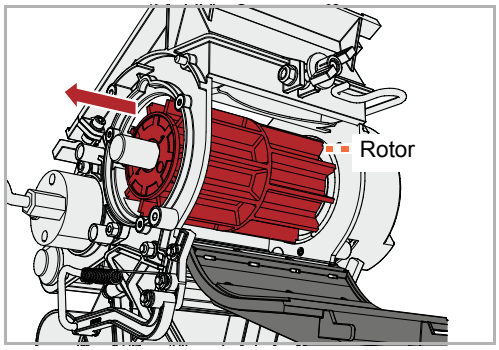
- Switch on the terminal.
- Switch off the headland management.



- Press and hold the key on the metering device for at least 3 s and then hold it pressed. The metering device starts and the seed falls into the dispensing sack.
- Release the key once the dispensing sack is full. Metering device stops.
- Empty the dispensing sack and hook it back below the metering device.
- Repeat the process until the metering device has completely emptied.



- Release the knurled screw on the cover.
- Remove the cover. The cover is secured by means of a cable.



- Gently turn the rotor back and forth and remove it.
- Clean the rotor and check it for wear.
- Install the corresponding rotor.
- Attach the cover and secure it using knurled screws.
- Close the emptying flap and secure it with the wing nut.

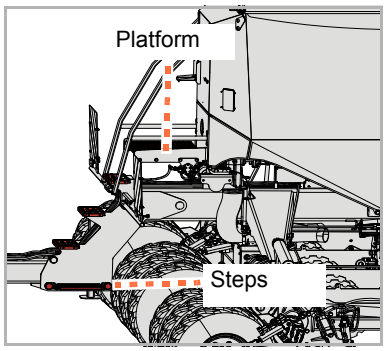
Cleaning

A high-pressure cleaner, for example, can be used for cleaning.

Do not direct the water jet at the bearings
Clean the bearings in such a way that the water jet does not directly hit the bearings.
The ingress of water shortens the service life of the bearings. Housings, signal distribution boxes, electric drive motors, screw-on connections, and ball bearings are not waterproof.

Before cleaning, remove the seed from the seed hopper using the dosing slider and from the metering device using the emptying flap.
→ Chapter »Sowing«, section »After sowing«, page 121

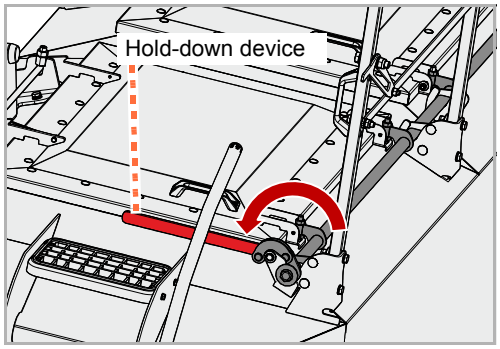
Steps, platform, seeding machine



Cleaning steps and platform
The steps and the platform must be thoroughly cleaned after every operation in the field.
Dirt build-up presents an increased risk of accidents and injury.

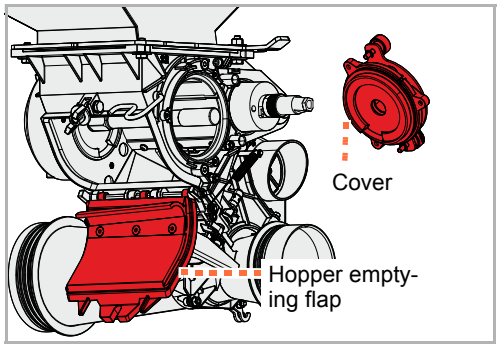
Only clean the seeding machine from the outside and only with water
The inside of the hopper or the metering device must not be cleaned with water.
Water can result in caking.

Prior to cleaning



- Close the cover on the front and rear hoppers.
- Close the hold-down device.

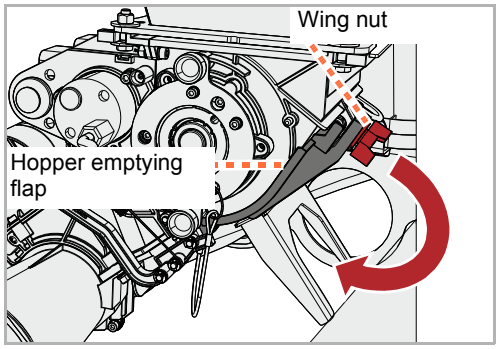
After cleaning



- Open the cover and inspect the seed hopper for moisture. Wipe dry if necessary.
- Open the cover and emptying flap on the metering device and leave to dry.

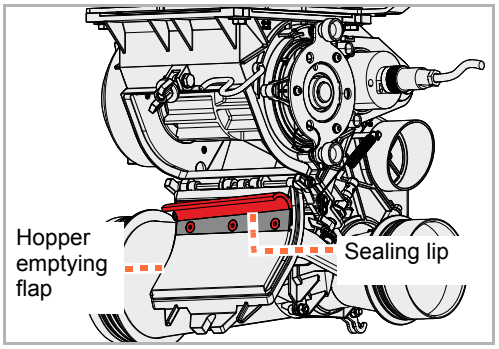
Metering device

Under no circumstances may a high-pressure cleaner be used for the following cleaning operations.



- Loosen the wing nut and fold it upwards.
- Open the hopper emptying flap.

Sealing lip

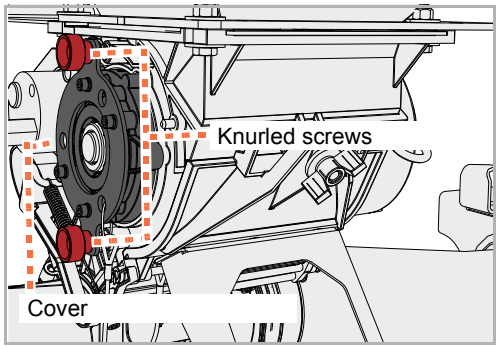


- Clean the sealing lip.
- Replace the sealing lip if it is worn or deformed.

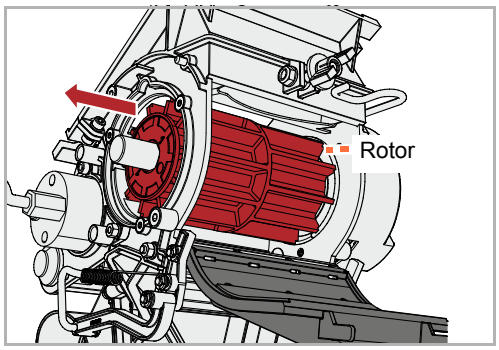
Seals

- Clean the seals on the emptying flap and on the flap for the calibration test.
- Replace the seals if they are worn or deformed.

Metering device rotor and interior



- Loosen the knurled screws.
- Remove the cover. The cover is secured by means of a cable.



- Turn the rotor slightly and remove it.
- Clean the rotor.
- Replace the rotor with a new rotor if it is worn or deformed.
- Blow out the interior of the metering device with compressed air or clean it with a dry brush.
- Loosen any caked-on residue with a suitable tool.

Seed hoses and seed hopper

Wear breathing protection
When blowing out with compressed air, breathing protection must be worn, especially when dressed seeds were used.
Dressing dust can be harmful to your health.

- Blow out the seed hoses and the seed hopper with compressed air.

Coulter and press wheels

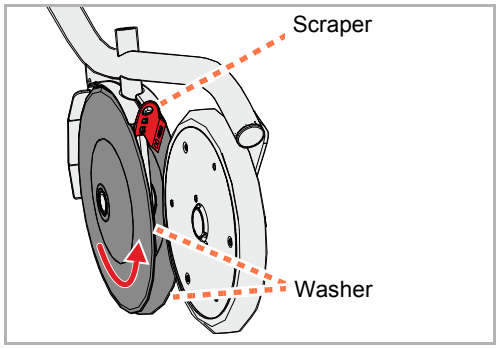
- Clean coulters and press wheels with a high pressure cleaner. Do not direct the water jet directly at the bearings.

Checking the seed coulters

Check the discs on the seed coulters
The discs on the seed coulter must be easy to turn.
If the discs do not turn easily, the discs become blocked and grind in the lower area.

Prerequisite:

- Machine is in the headland position



- Turn both discs on the seed coulters manually in the direction of the arrow and, in doing so, check that it is running smoothly.

If the discs are not easy to turn, they may become blocked in the case of flat seeding in dry, light soil and may grind in the lower area. This may be caused by a worn scraper.

- Check the scraper for wear.
- Replace the worn scraper.

→ Chapter »Maintenance«, section »Scraper«, page 159

Care

To ensure the machine's long service life, we recommend applying a protective coating of oil after the end of the season and during storage. Use only approved and biodegradable oil, e.g. rapeseed oil.



Before applying the oil, cover the tyres of the transport wheels and the wheel packers. The oil can damage the tyres.

Implements

Before parking, check the depth adjustment:

- Track eradicator
- Disc harrow
- Coulter bar

If you park the machine in the work position, these tools should not be set so deep that they support the weight of the machine during parking.

Parking and securing the machine

Increased risk of injury
Uncoupling the machine creates an increased risk of injury.

- Ensure that the machine is lowered onto a level and stable surface
- Use support legs to stabilise the machine

Failure to observe these instructions may result in serious or fatal injuries.

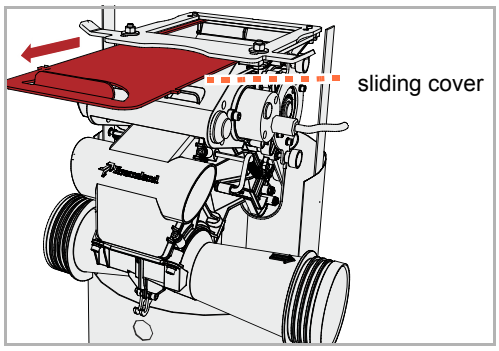
Emptying the seed hopper

▸ Empty the seed hopper.
→ Chapter »Sowing«, section »After sowing«, page 121
▸ Close the cover on the empty seed hopper.

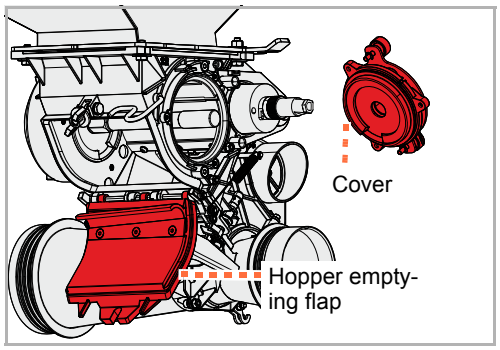
Emptying the metering device

▸ Empty the metering device.
→ Chapter »Sowing«, section »After sowing«. Page121

Storing the seeding machine with the metering device open
When storing out-of-season, leave the cover and the emptying flap on the metering device open. Humidity or rodents may damage the metering device.
Otherwise, damage to the machine may be caused as a result.

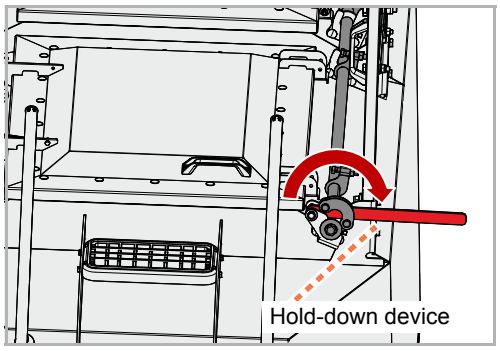


▸ Open the sliding cover.



- Open the hopper emptying flap.
- Remove the cover.
- Remove the rotor and store it in toolbox.

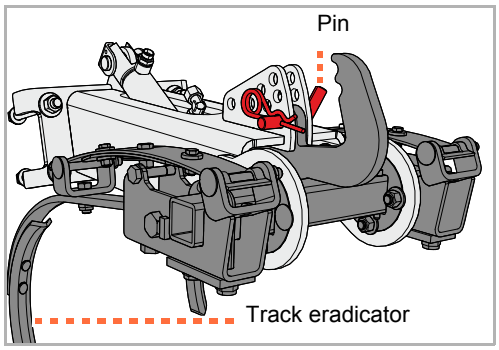
Releasing the seal in the cover



Release the seals in the hopper covers to avoid damaging them.

- Open the hold-down device on the cover.

Track eradicator [+]

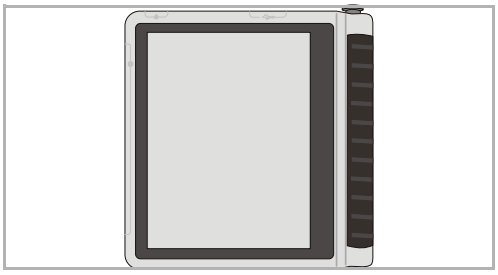


The track eradicators must not be in contact to the ground when the machine is parked up.

Make identical changes to all brackets:

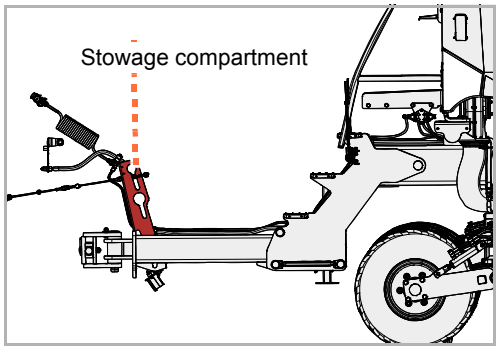
- Lift the machine.
- Remove split pin from pin.
- Remove the pin and insert it into position in the regulating piece as shown.
- Secure the pin with a split pin.

Terminal [+]



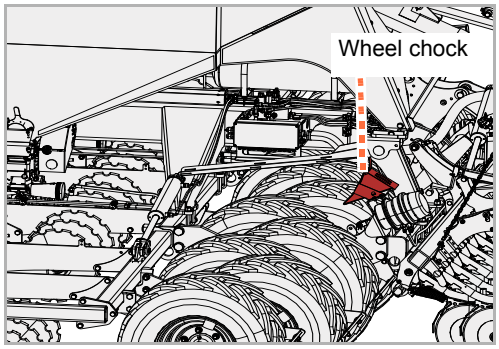
- Switch off the terminal.
- Disconnect the external terminal from the connection lines and remove from the bracket on the tractor.
- Store in a dry location.
  The set values are preserved.

Disconnecting the connections



- Disconnect hydraulic hoses and pneumatic or hydraulic brake lines from the tractor.
- Protect the couplings and stow them in the stowage compartment.
- Disconnect the electrical cables and stow them in the stowage compartment.
- Disconnect any other lines to the tractor.
- Attach the protective caps to the unprotected ends of the lines.

Uncoupling

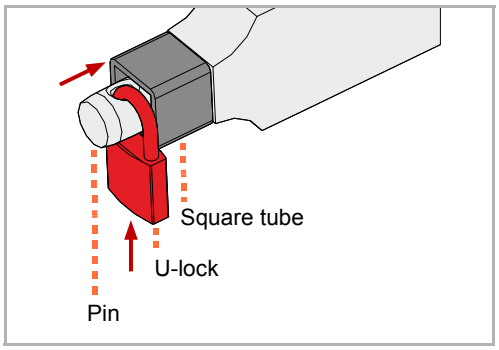


- Place wheel chocks under the front and rear of a transport wheel.
- Move the supporting leg into the parking position.
- Open the lower links.
- Uncouple the machine.

Locking and securing

To secure the machine, u-locks corresponding to the type of coupling on the tractor are included in the scope of delivery.

Lower link connection



- Place the square tube on the pin of the lower link and secure with the u-lock.

Storing the machine

After cleaning, the machine should be stored in transport position in a dry location and on a level and stable surface.
→ Section »Parking and securing the machine«, page 129

Apply a protective coating of oil during storage. Use only approved and biodegradable oil, e.g. rapeseed oil.

Before oiling, cover the tyres of the transport wheels and the wheel packers. The oil can damage the tyres.
→ Chapter»Cleaning and care«

For your safety

Special safety information



Prerequisites for maintenance work
Only perform the maintenance operations if you have the required expert knowledge and suitable tools.
Insufficient technical knowledge or the use of unsuitable tools can cause accidents.

Protect the machine against unintended starting
Only carry out repair and maintenance work and only rectify faults on the coupled machine if:

- Deactivated PTO
- Engine switched off
- Ignition key removed
- Electronic control switched off

Serious accidents may be caused if the machine starts accidentally.

Replacement parts and accessories
Only use original parts or parts that meet the manufacturer's requirements. In case of doubt, confirm the suitability of the parts with the dealer or manufacturer.
Using unsuitable replacement parts and accessories compromises the safety of the machine. Damage to the machine and serious accidents are then possible.



Welding work
Before welding work on the tractor or machine, always disconnect the voltage supply to the electronic control system.
Otherwise, damage to the electronics cannot be excluded.

Do not use pneumatic grease guns
Never use a pneumatic grease gun to lubricate bearings.
The high pressure damages the bearings.

Protective measures when handling oils or lubricants

Additives in oils and lubricants may have adverse effects on health. Since the hazardous material code does not require any special identification, always observe the following:



Avoid skin contact
Avoid skin contact with these materials.
Contact can result in skin damage.

Protect your skin
When handling oils and lubricants, protect your skin with lotion or wear oil-resistant gloves.
Oils can be hazardous to your health.

Do not use oils for cleaning
Do not use oils or lubricants to clean your hands.
Swarf and abraded material in these materials can also result in injuries.

Change out of dirty clothing
Change any clothing that is heavily contaminated with oil as quickly as possible.
Oils can be hazardous to your health.



- Collect waste oil and dispose of in accordance with legal conditions
- If your skin becomes irritated by oil or lubricants, contact a doctor immediately

General information

This information relates to general servicing work. For all maintenance work, the machine must be folded out and secured in its work position. If it is necessary to put the machine in its transport position for maintenance work, an appropriate reference will appear in the maintenance instructions.



Working with the grease gun:
One to two grease gun strokes handle are sufficient for lubrication. If you feel resistance during the second stroke, do not complete it.
Too much grease will force the bearings apart. This could allow dust and dirt to enter the bearing, resulting in premature wear.

Fundamentals

The following table contains a brief explanation of the most important terms used for maintenance.

Task	Explanation
Greasing	• Apply grease to sliding surfaces with a brush
Lubrication	• Unless otherwise specified, 1 – 2 pumps with a grease gun are generally sufficient
Oiling	• Unless otherwise specified, use only vegetable-based oil such as rapeseed oil • Mineral oils are not suitable • The use of waste oil represents a health hazard and is strictly prohibited
Replacement	• Replace the component in question according to the instructions in the »Maintenance« chapter
Inspection	• An inspection may be required in conjunction with the replacement of the component in question
Observe the maintenance intervals	• All information is based on average machine usage • In the case of heavy usage (e.g. contract work), shorten the maintenance intervals accordingly • Shorter maintenance intervals may also be required under extreme operating conditions (e.g. heavy dust generation)

Securing the machine

Before any tasks are carried out directly on the machine, by you or by other persons, you must secure the machine.



Hazard due to an unsecured machine
An unsecured machine can cause hazards which are not immediately obvious. Secure the machine before carrying out any tasks directly on the machine.
If the machine is not secured, persons may be injured or killed.

You can secure the machine while it is folded in or folded out.

- Switch off the machine's electronic control system.
- Switch off the tractor's PTO.
- Switch off the tractor engine.
- Secure the tractor against starting up accidentally.
- Secure the tractor against rolling away.

Working under the machine



Hazard due to an unsecured machine
An unsecured machine can cause hazards which are not immediately obvious. Secure the machine before carrying out any tasks directly on the machine.
If the machine is not secured, persons may be injured or killed.

- Mechanically secure the machine against lowering.

Folded in

- Switch off the machine's electronic control system.
- Switch off the tractor engine.
- Secure the tractor against starting up accidentally. In a clearly visible location, attach an information label stating that the tractor must not be put into operation.
- Secure the tractor against rolling away.
- Secure the machine against rolling away using wheel chocks.

→ Chapter »Parking and storage«, section »Parking and securing the machine«, page 129

Folded out

- Lower the tools.
- Switch off the machine's electronic control system.
- Switch off the tractor engine.
- Secure the tractor against starting up accidentally. In a clearly visible location, attach an information label stating that the tractor must not be put into operation.
- Secure the tractor against rolling away.

Maintenance intervals and setting work

	After the first hours of operation	Daily	After 40 hours of operation	After 75 hours of operation	After 250 hours of operation	After heavy use	Once per season	As required	In case of wear	Grease / Oil / Lubricate	Inspection	Replacement	Adjusting	Cleaning	Page
General															
Tightening screws															141
On the main fastening for the disc harrow	•				•			•							141
On the main fastening for the coulter bar	•				•			•							141
On the main fastening for the wheel packer	•				•			•							141
All other bolts	•							•							141
Visual inspection	•	•													
Bearings		•		•						•					143
Hose connections							•				•				
Pivot points (frame, track markers)		•		•						•	•				143
Bearings on the chassis		•								•					143
Hydraulics															
Hydraulic hoses every six years												•			168
Hydraulic hoses in general								•	•			•			168
Hydraulic cylinder for the wheel packer				•							•				
Hydraulic cylinders on track markers				•							•				
Hydraulic cylinder on the disc harrow				•							•				
Hydraulic fan drive							•				•				

	After the first hours of operation	Daily	After 40 hours of operation	After 75 hours of operation	After 250 hours of operation	After heavy use	Once per season	As required	In case of wear	Grease / Oil / Lubricate	Inspection	Replacement	Adjusting	Cleaning	Page
Brakes															
Air pressure brake															168
Adjusting								•							171
Draining				•			•								171
Hydraulic brake							•				•				
Adjusting								•							168
Fan															
Fan drive wheel									•			•			
Seeding technology															
Cover and reduction head								•	•			•			
Seals in the hopper cover			•				•				•	•			163
Hose connections							•				•				
Metering device															
Sealing lip							•		•		•	•		•	125
Rotor							•		•		•	•		•	126
Seals			•								•	•			125
Seed coulters															
Seed coulters (general)									•			•			158
Scraper									•			•			158
Discs								•	•			•			158
Press wheels							•				•				160
Disc harrow															
Disc harrow									•					•	151
Spindles							•				•				151
Discs								•	•			•			151

	After the first hours of operation	Daily	After 40 hours of operation	After 75 hours of operation	After 250 hours of operation	After heavy use	Once per season	As required	In case of wear	Grease / Oil / Lubricate	Inspection	Replacement	Adjusting	Cleaning	Page
Software															
All sensors		•									•				167
									•			•			
								•					•		
Other															
Wheels															150, 152
Tyres							•				•				
									•			•			
Tyre pressure	•						•				•				150, 152
Axle							•			•					
Lower link connection		•								•					143

Screw connections

Re-tightening the bolts

All screws must be retightened:

- After the first hours of operation
- Depending on the frequency of use
- But at least once a season

Tightening torques, general

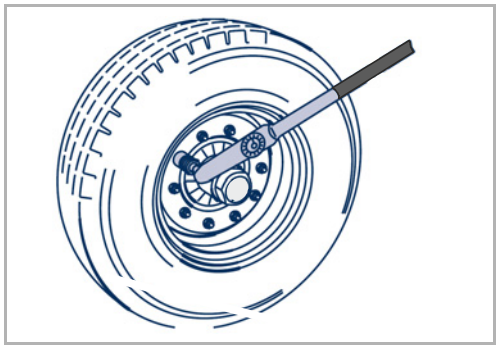
Tighten all screw connections using the information provided in the table. If different tightening torques are necessary, they are specified accordingly in the »Maintenance« chapter. The minimum quality of the bolts is “8.8”.

Bolt size	Bolt quality		
	„8.8“	„10.9“	„12.9“
	Tightening torques in Nm		
M6	9.9	14	17
M8	24	34	41
M10	48	68	81
M12	85	120	145
M16	210	290	350
M20	425	610	710
M24	730	1050	1220
M27	1170	1675	1960
M30	1600	2275	2660
M12x1.5	75	89	125
M14x1.5	125	150	205
M16x1.5	190	220	310
M18x1.5	270	320	450
M20x1.5	380	450	630
M22x1.5	510	600	850
M24x1.5	670	800	1120
M27x1.5	990	1170	1640

Tightening torques, special

Wheel nuts

After 250 hours of operation



The tightening torque for the wheels of the wheel packer roller and transport wheels is 350 Nm for M18x1.5 bolts.

Lubricating the bearings

The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

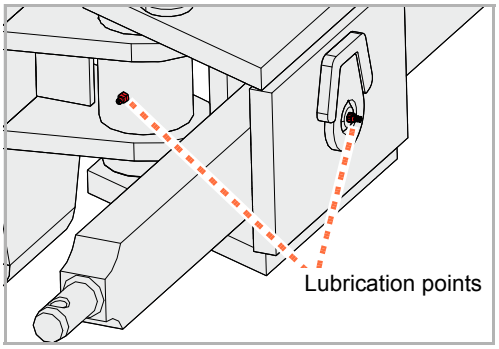
- According to the maintenance chart
- After heavy use
- But at least once a season

Do not lubricate maintenance-free bearings.

Lower link connection

The lower link connection has two lubrication points.

Daily

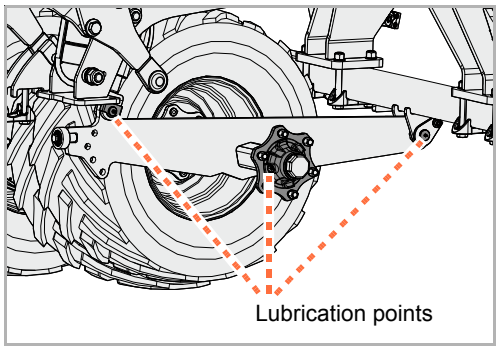


- Lubricate daily with one to two pumps of the grease gun.

Chassis

There are four lubrication points on the rocker arm for the central pair of wheels.

Daily

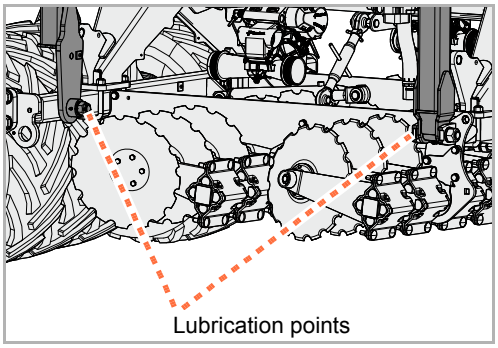


- Lubricate with one to two pumps of the grease gun.

Disc harrow

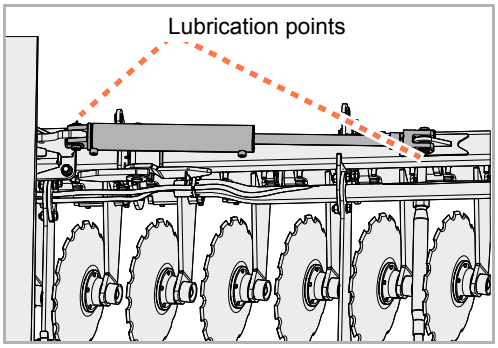
Daily

There are two lubrication points on the disc harrow side sections.

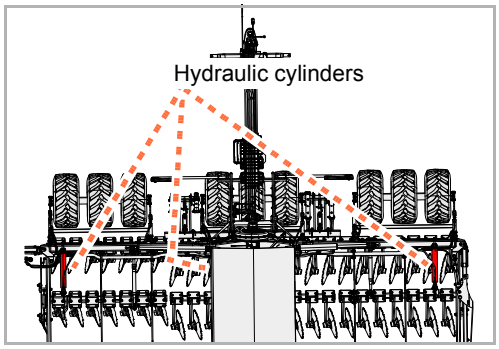


- Fold the disc harrow in.
- Lubricate the lubrication points on the pivot points.
- Lubricate the bearing on the other side of the machine.

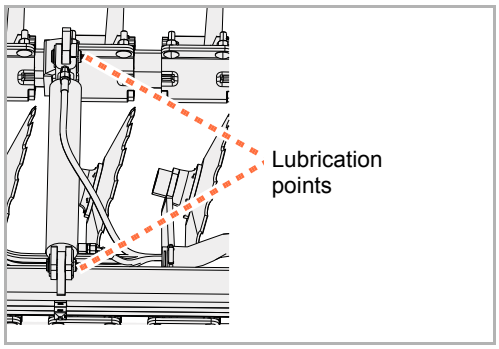
There are two lubrication points on each of the disc harrow folding hydraulic cylinders.



- Fold the disc harrow out.
- Lubricate the lubrication points on the pivot points.
- Lubricate the bearing on the other side of the machine.



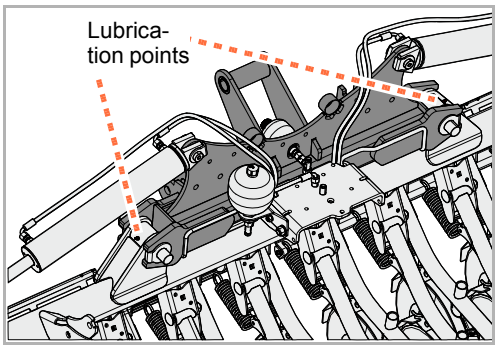
There are two lubrication points on each of the disc harrow hydraulic cylinders for depth adjustment.



- Lubricate the lubrication points on the hydraulic cylinder.

Coulter bar

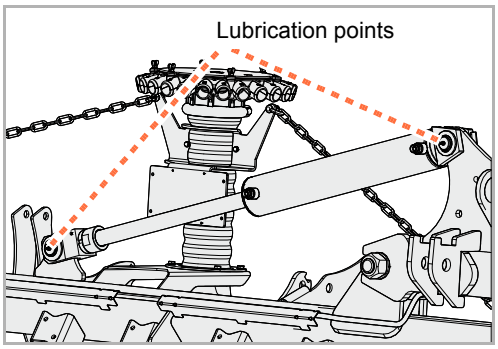
Daily



The coulter bar has two lubrication points.

- Fold out the coulter bar.
- Lubricate the lubrication points on the pivot points.

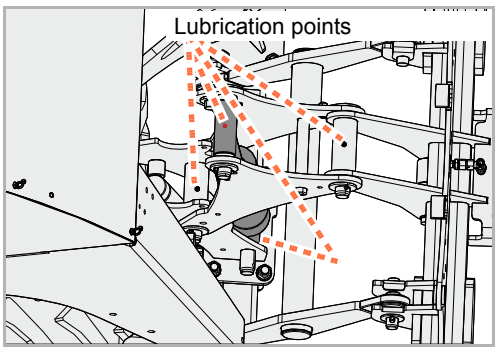
There are two lubrication points on each of the coulter bar folding hydraulic cylinders.



- Fold out the coulter bar.
- Lubricate the lubrication points on the pivot points.

Coulter bar lifting

Daily



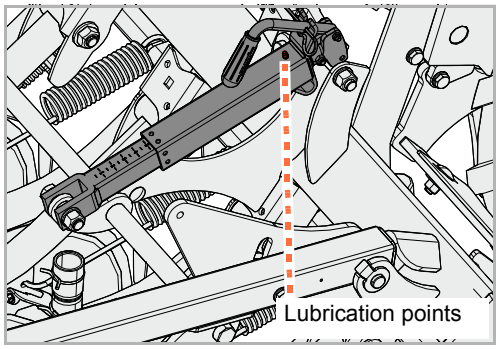
There are four lubrication points on the coulter bar lifting system.

- Fold out the coulter bar.
- Lubricate the lubrication points on the pivot points.

S-tine harrow and finger-tine harrow

Once per season

There is a lubrication point on the spindle of the S-tine harrow and the spindle of the finger-tine harrow.

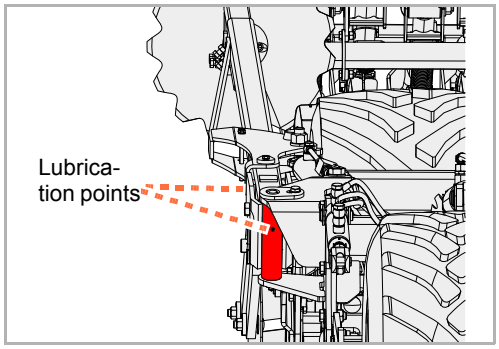


- Lubricate with one to two pumps of the grease gun.

Track marker [+]

Daily

The track marker has two lubrication points.

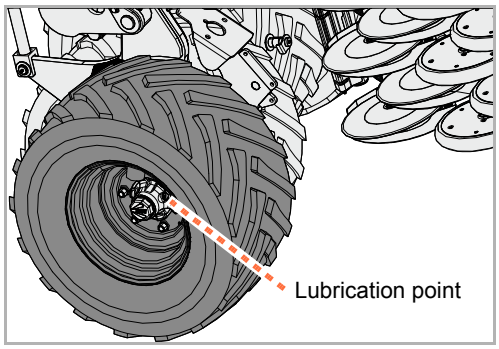


- Fold in the track marker.
- Lubricate the lubrication points on the pivot points.

Bearings on the rear wheel packer

Once per season

There is a lubrication point on each axle of the rear wheel packers.

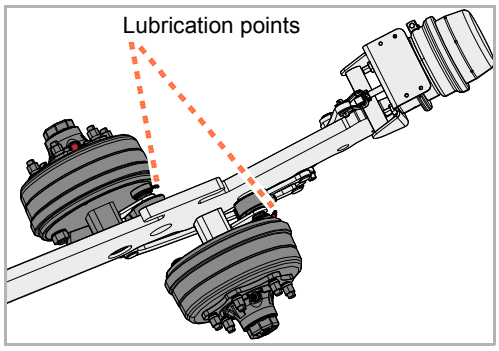


- Lubricate with one to two pumps of the grease gun.
- Lubricate the bearings on all axles.

Brake system

Once per season

The brake system has two lubrication points on each side of the machine.



- Bring the machine into the transport position.
- Secure the tractor against rolling away.
- Remove the wheel.
- Lubricate with one to two pumps of the grease gun.
- Fit the wheel.
- Remove the wheel from the other side of the machine.
- Lubricate with one to two pumps of the grease gun.
- Fit the wheel.
- Tighten all wheel nuts to 350 Nm.

Other lubrication points

Generally:

- In addition to the lubrication points shown in this operating manual, your machine may have other lubrication points.
- As a rule, lubrication points are located at pivots or bearings. Therefore, check the entire machine for any such lubrication points.

The position of the lubrication points is shown as an example for one component. If several components are available, each component's lubrication points have to be lubricated accordingly.

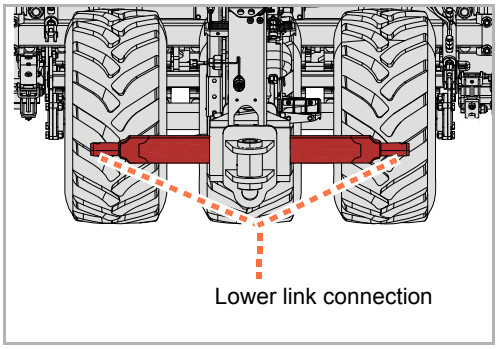
Bolted connections to the tractor

Once per season

You must check all the bolts and the holes for them in the bolted connection to the tractor.

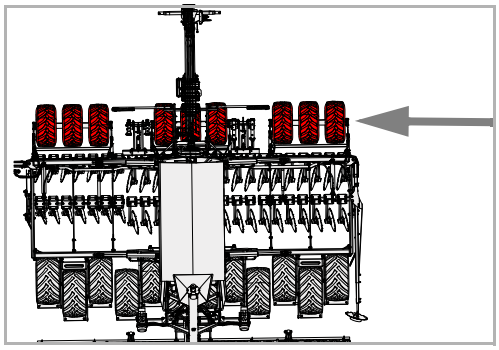
- The measurements must be within the specified range
- Worn parts must be replaced

	CAT 2N / CAT 2	CAT 3N / CAT 3	CAT 4N / CAT 4
Lower link connection			
Bolt diameter [mm]	27.80 - 28.00	36.4 - 36.60	49.70 - 50.80
Hole diameter [mm]	28.70 - 29.00	37.4 - 37.75	51.00 - 51.50



- Check all the bolts and the holes for them using the measurements given in the table.

Front wheel packer [+]



Checking the tyre pressure

Once per season

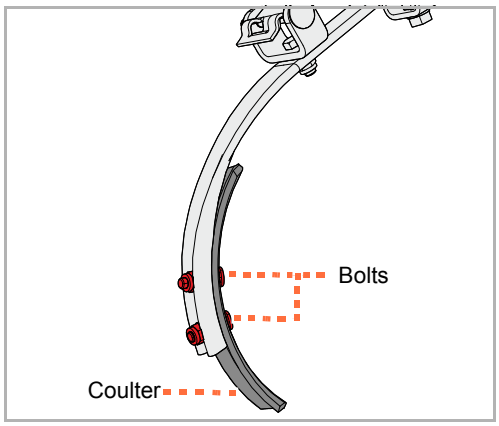
The tyre pressure should be approximately 2.0 bar.

Track eradicator [+]

Rotate or replace the coulters

As required

If the coulters are only worn on one side, you do not have to replace the coulters. You can turn the coulters.



- Undo the bolts and turn the coulter.
- Tighten the bolts securely.

Or

- Undo the bolts and remove the coulter.
- Insert a new coulter and tighten the bolts.

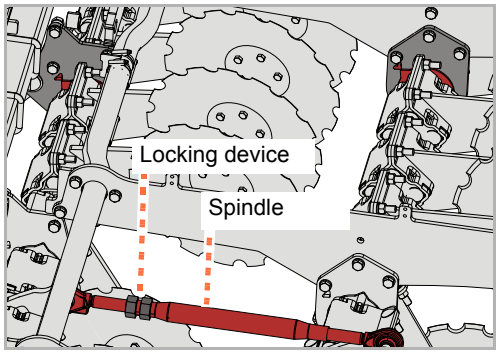
Disc harrow

- Grease the spindles
- Tightening screws
- Renew the tightening screws

Spindles

The spindles of the disc harrow must be greased regularly.

Once per season

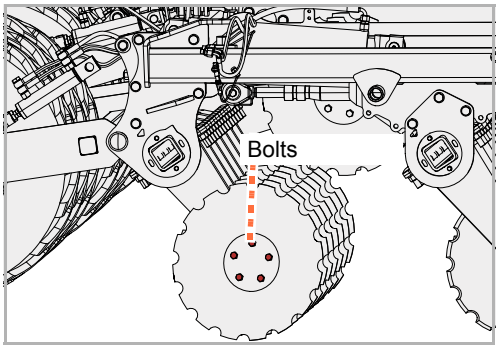


- Release the lock.
- Extend the spindle slightly.
- Grease the thread.
- Thread the spindle back into the original position.
- Lock the spindle again.

Bolts

All bolts at the discs must be retightened after the first operating hours.

After the first hours of operation

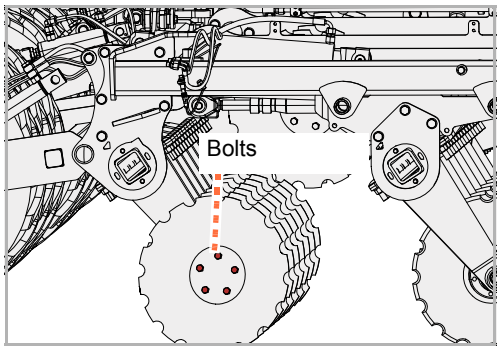


Discs

If a disc is defective, replace it.

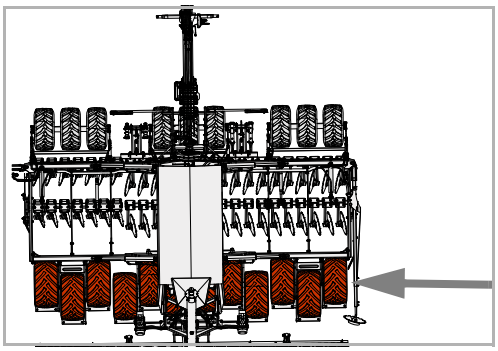
As required

Risk of injury through cutting
Wear protection gloves. Cover discs with a blanket or something similar.
When working without protection gloves and a cover, cutting injuries may occur if someone touches the discs.



- Release the bolts and remove the disc.
- Replace the disc.
- Reinsert the bolts.
- Tighten the bolts securely.
- Retighten the bolts again after the first two hours of operation.

Rear wheel packer



Checking the tyre pressure

Once per season

The tyre pressure should be approximately 2.0 bar.

- Check the tyre pressure.

Replacing tyres

As required

Replace the damaged tyres:

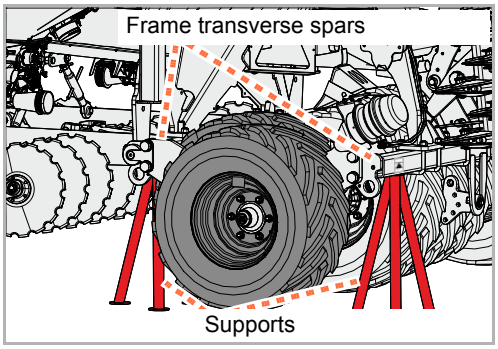
Tyres with the following characteristics must be used:

	Specifications
Manufacturer	BKT
Dimensions	420 / 55-17
Number of bearings	16PR
Load index	145
Speed Index	A8
TL/TT	TL
Profile	AS-504
Test number	E4 106R

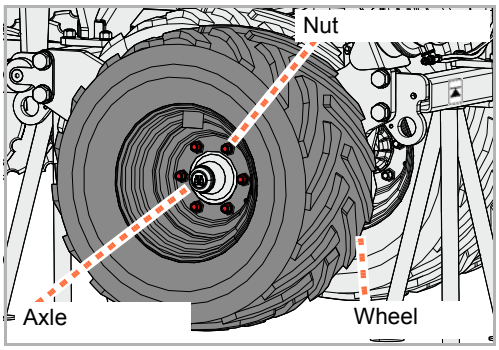
Should you use tyres from other manufacturers, make sure that they can turn freely and do not rub against fixed components anywhere.

Prerequisites for work:

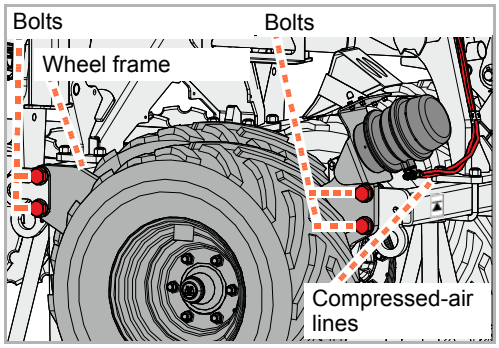
- Machine is coupled to the tractor and all connections are properly made
- The machine is in transport position.
- Handbrake in tractor is applied
- Machine is secured with wheel chocks against rolling away



- Use a car jack with a load-bearing capacity of at least 5000 kg to raise the machine until the wheels that need changing are suspended freely.
- Place two appropriately sized struts with a load-bearing capacity of at least 2500 kg under the front and rear transverse spars of the frame.

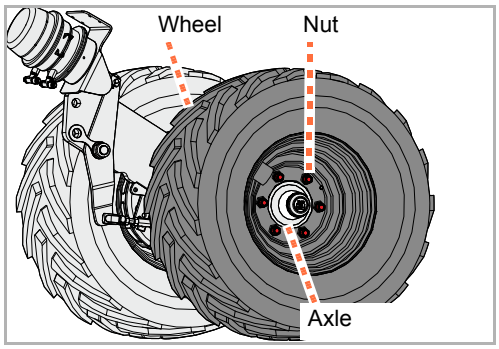


- Undo and remove the nuts.
- Remove the wheel from the axle.
- Replace the tyre.
- Put the wheel back on the axle and secure it to the specified tightening torque of 350 Nm using nuts.

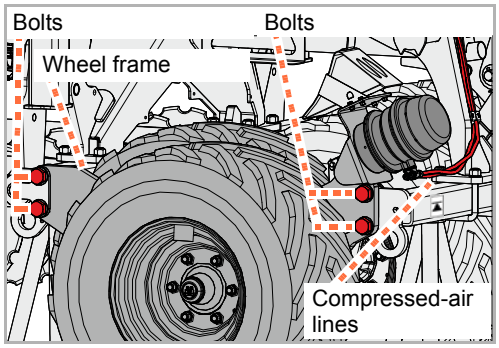


If you need to change the inside wheel on a machine with air pressure brake:

- Let the air out of the air pressure brake.
- Mark the compressed-air lines.
- Disconnect the compressed-air lines.
- Remove the bolts.
- Take out the wheel frame with wheels.

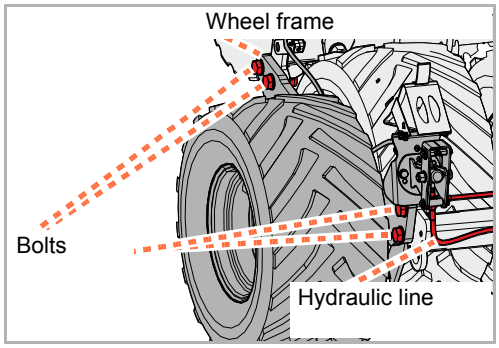


- Undo and remove the nuts.
- Remove the wheel from the axle.
- Replace the tyre.
- Put the wheel back on the axle and secure it to the specified tightening torque of 350 Nm using nuts.

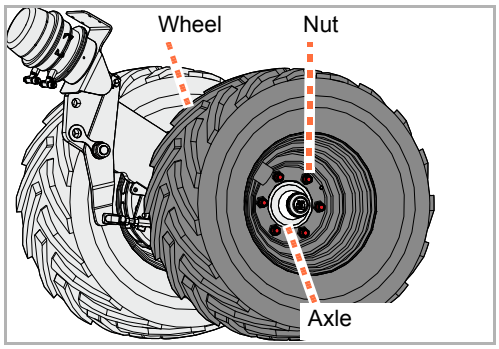


- Insert the wheel frame with wheels and secure it to the specified tightening torque of 350 Nm using screws.
- Connect the compressed-air lines as you found them.

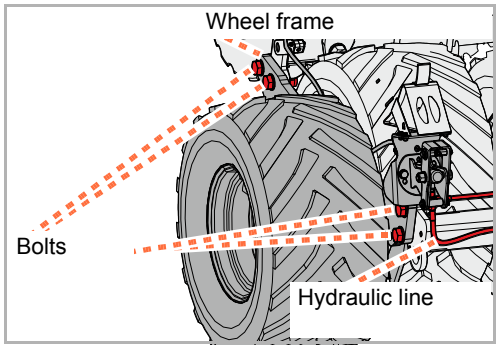
If you need to change the inside wheel on a machine with hydraulic brake:



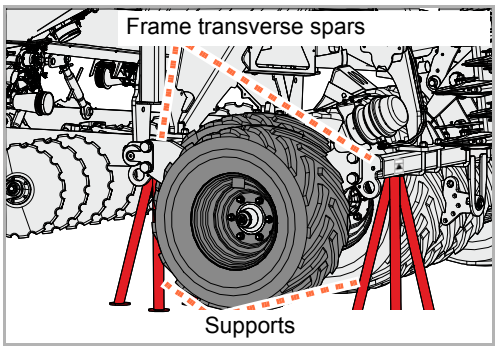
- Depressurise the brake lines.
- Mark the hydraulic line.
- Disconnect the hydraulic line.
- Remove the bolts.
- Take out the wheel frame with wheels.



- Undo and remove the nuts.
- Remove the wheel from the axle.
- Replace the tyre.
- Put the wheel back on the axle and secure it to the specified tightening torque of 350 Nm using nuts.



- Insert the wheel frame with wheels and secure it to the specified tightening torque of 350 Nm using screws.
- Connect the hydraulic lines as you found them.



- Use a car jack to raise the machine until the struts no longer bear any weight.
- Remove struts.
- Lower the machine until the car jack can be removed.

If the compressed-air line was disconnected, you will need to check the air pressure brake:

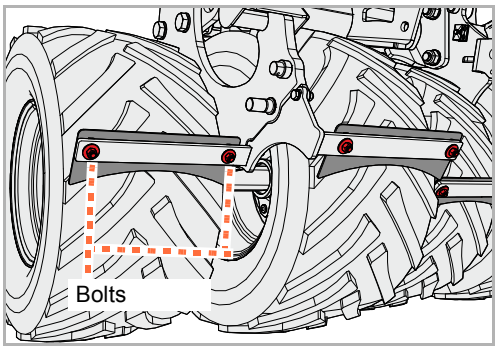
- Connect the air pressure brake to the tractor.
- Fill the pneumatic system with air.
- Test the brakes.

If the hydraulic line was disconnected, you will need to check the hydraulic brake:

- Connect the hydraulic brake to the tractor.
- Fill the hydraulic brake with oil.
- Test the brakes.

Scraper

In case of wear



- Loosen the bolts on the scraper and adjust the scraper.
- Tighten the bolts securely.

Or

- Loosen the bolts on the scraper and remove the scraper.
- Insert a new scraper and tighten the bolts securely.

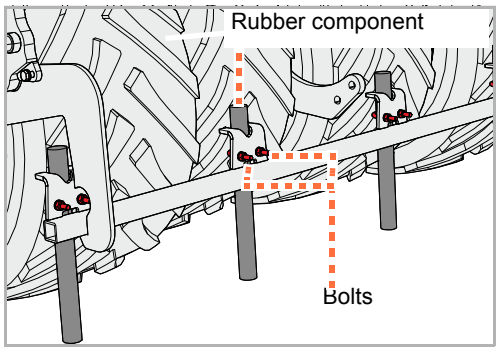
Levelling bar [+]

- Replace the rubber component.

If the rubber components on the levelling bar are worn, you must replace these. Individual rubber components can be replaced.

Rubber component

In case of wear



- Loosen the bolts on the rubber component and adjust the rubber component.
- Tighten the bolts securely.

Or

- Loosen the bolts on the rubber component and remove the rubber component.
- Insert a new rubber component and tighten the bolts.

CD mulch seed coulter

On the CD seed coulter, you can replace the following:

- Discs
- Scraper
- Tension springs
- Press wheel
- Scraper on the press wheel

▸ Secure the machine.

→ Chapter »Maintenance«, section »Securing the machine«, page 137

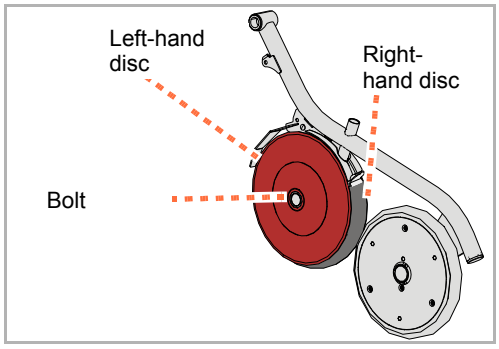
▸ Relieve the coulter pressure as much as possible.

→ Operating manual for the software, section »Other applicable documents«, page 5

Risk of injury through cutting
Wear protection gloves. Cover discs with a blanket or something similar.
When working without protection gloves and a cover, cutting injuries may occur if someone touches the discs.

Discs

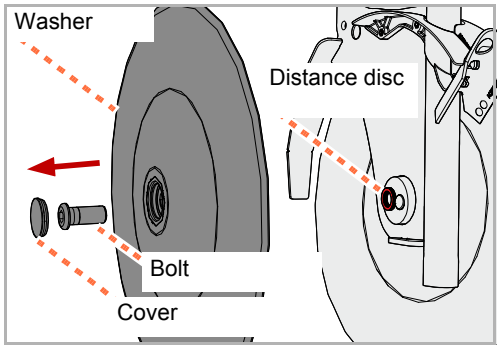
In case of wear



The discs on the seed coulter are arranged in pairs. The bolt on the left-hand disc has a left-hand thread. The bolt on the right-hand disc has a right-hand thread.

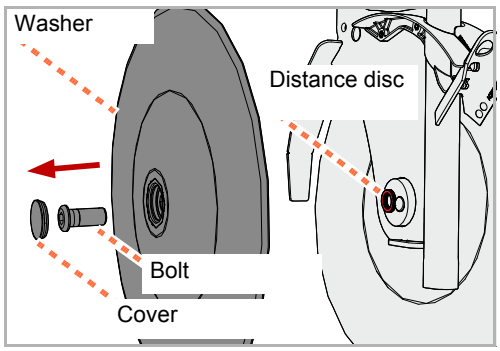
If the discs on the seed coulter are worn, the gap between these two discs increases; this may lead to clogging and to the discs not working. This has a negative effect on the quality of the seeding work.
You can reduce the gap between the discs or you have to replace the discs.

Setting the gap



▸ Remove the covers.
▸ Undo the bolts from the discs and remove the discs.
▸ Remove the shims and keep them in a safe place.
▸ Proceed in the same way for both discs on a coulter.
▸ Insert the discs and tighten the bolts securely.
▸ Refit the covers.

Replacing the discs

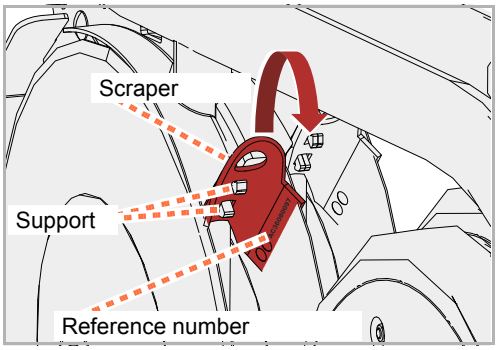


- Remove the covers.
- Undo the bolts from the discs and remove the discs.
- Refit the shims that were removed previously.
- Insert new discs and tighten the bolts securely.
- Refit the covers.

Scraper

The scraper is made of hard rubber and is located on the top seed coulter, between the right-hand and left-hand disc.

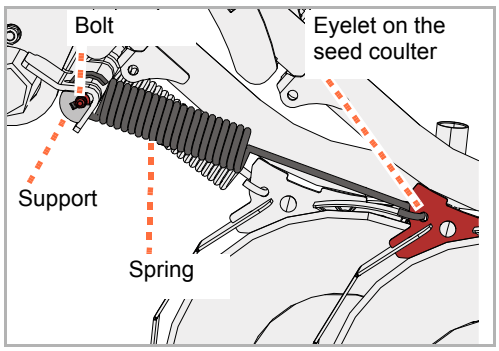
In case of wear



- Pull the old scraper up and out of the holder.
- Select the position of the scraper so that the reference number remains visible.
- Insert and press on the new scraper.

Tension spring

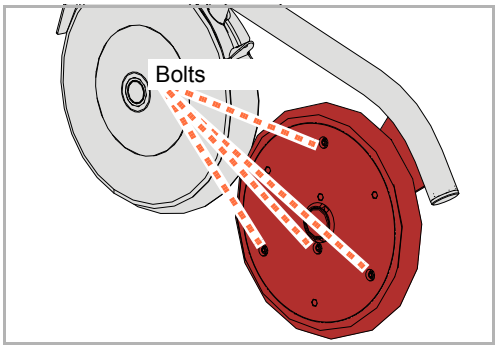
In case of wear



- Release and remove the bolt on the bracket.
- Remove the bracket.
- Take off the spring and remove it.
- Insert a new spring into the eyelet on the coulter.
- Insert the bracket and connect the spring to the bracket.
- Secure the bracket with the bolt.

Press wheel

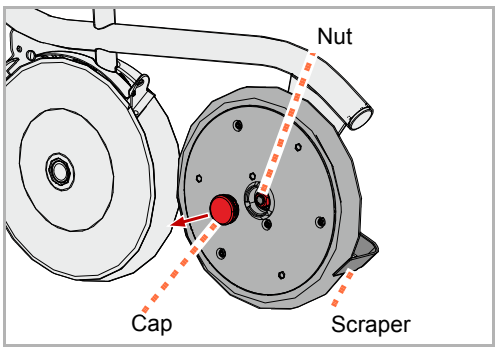
In case of wear



- Loosen the bolts on both sides of the press wheel and remove the press wheel.
- Insert the new press wheel and tighten the bolts.

Scraper on the press wheel

In case of wear



- Remove the cap from the press wheel.
- Undo the nut.
- Reset the scrapers.
- Tighten the nuts and fit the cap.

Or

- Remove the cap from the press wheel.
- Undo the nut.
- Pull out the bolt.
- Replace the scraper.
- Insert the bolt.
- Tighten the nuts and fit the cap.

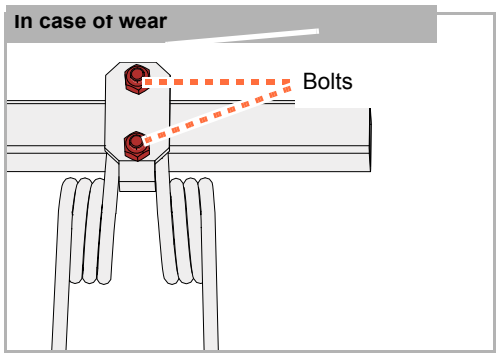
Seed-covering harrow

Works:

- Replace the seed-covering harrow
- Lubrication

If the seed-covering harrows are worn, they must be replaced. Individual seed-covering harrows can be replaced.

Seed-covering harrow



- Loosen the screws and remove them.
- Remove seed-covering harrows and replace with new units.
- Insert the bolts and tighten securely.

Metering device

Before you start the work, you must remove any remaining seed from the seed hopper and from the metering device.

→ Empty the seed hopper and the metering device, chapter »Operation«, section »After sowing«, page 121

You must regularly check the following on the metering device:

- Sealing lip

→ Check the sealing lip, chapter »Cleaning and care«, »Sealing lip«, page 125

- Rotor

→ Check the rotor, chapter »Cleaning and care«, section »Metering device rotor and interior«, page 126

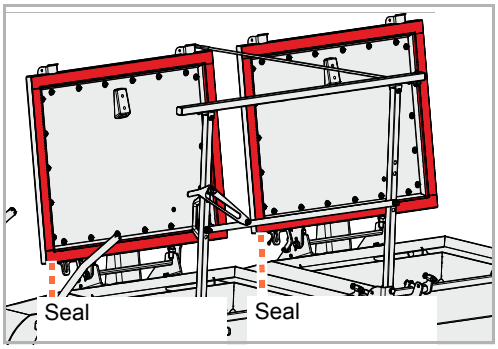
- Seals

→ Check the seals, chapter »Cleaning and care«, section »Seals«, page 125

Seal on the hopper cover

Check the seals on both hopper covers on a regular basis. When a difference of more than 5 mbar is displayed, there must not be any loss of overpressure. A defective seal leads to poor seeding results.

Checking the seal



- Check the seals for damage or wear and excessive deformation.

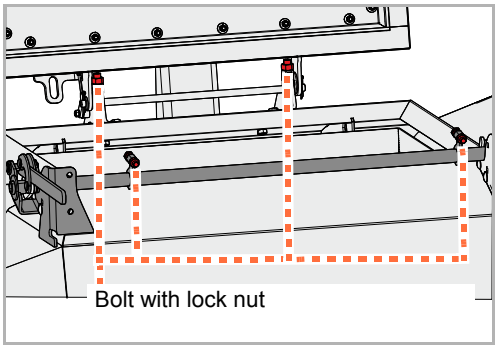
Seal OK

- Close the cover.

Loosening the pretension

If the seal shows little wear, loosen the cover pretension.

In case of wear



- Loosen the lock nuts.
- Unscrew the bolts.
- Secure the lock nuts.
- Close the cover.

Replacement

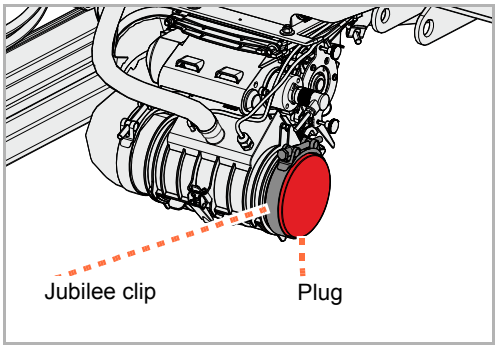
If the seal shows signs of damage, wear or excessive deformation, you must replace the seal.

In case of wear

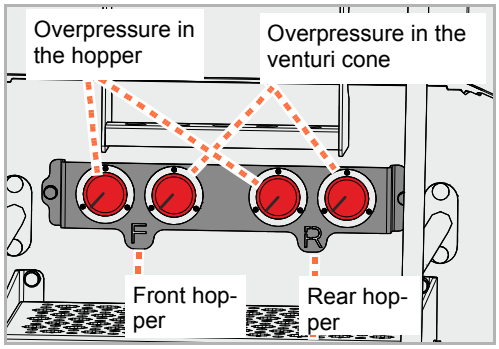
- Remove the old seal.
- Insert the new seal.
- Close the cover.

Checking the seal with the manometer

Once per season



- Loosen the jubilee clip on the outgoing hose lines from the metering device.
- Remove the hose line.
- Remove the plugs from the toolbox.
- Fit the plugs onto the connecting pieces and secure them using the jubilee clip.
- Prepare the second metering device in the same way.



- Switch on the fan drive and run it at a low speed.
- Read the overpressures on the manometers.

The difference between the overpressure levels within the hopper and on the accompanying venturi cone must not exceed 5 mbar.
The overpressure for one hopper may differ significantly from that of the other hopper, particularly if the air stream is reduced for applying the seed.

- Switch off the fan drive.

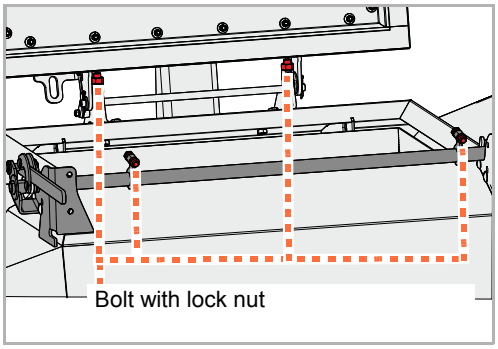
Seal OK

- Close the cover.

Loosening the pretension

If the seal shows little wear, loosen the cover pretension.

In case of wear



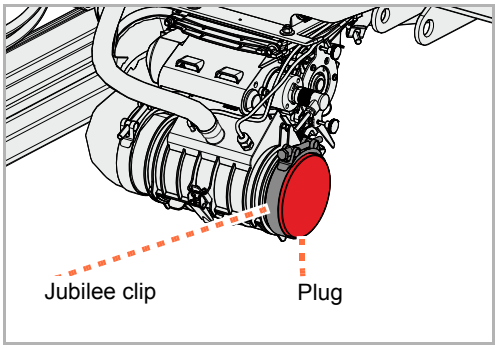
- Loosen the lock nuts.
- Unscrew the bolts.
- Secure the lock nuts.
- Close the cover.
- Repeat the test

Replacement

In case of wear

If the seal shows signs of damage, wear or excessive deformation, you must replace the seal.

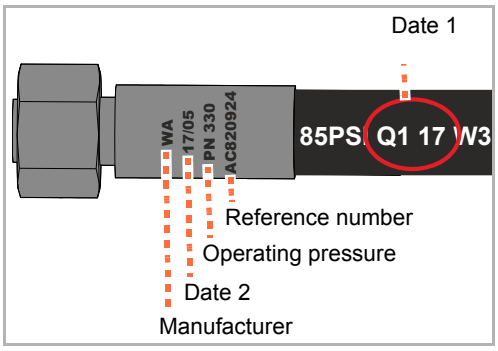
- Remove the old seal.
- Insert the new seal.
- Close the cover.
- Repeat the test.



- Undo the jubilee clip.
- Remove the plugs and store them in the toolbox.
- Install the hose line and secure it using the jubilee clip.
- Prepare the second metering device in the same way.

Hydraulic hoses

Hydraulic hoses can age without any externally visible signs. In accordance with international regulations, the hydraulic hoses must be replaced every 6 years.



The hydraulic hoses have codes both on the hose and on the swaging which give the production date of the hydraulic hose.

Designation	Meaning	Illustrative example
Date 1	Production date of hydraulic hose	1st quarter of 2017
Manufacturer	Abbreviation of assembly manufacturer	-
Date 2	Production date of hydraulic hose assembly	May 2017
Operating pressure	Maximum operating pressure	330 bar
Reference number	Reference number of hydraulic hose	-

The period of six years is calculated beginning on the production date of the hydraulic hose.

Replacing the hydraulic hoses

Every 6 years or if required

All pressure must be released from the hoses.
→ Chapter »Hydraulic system«, page 35

Sensors

This section contains information concerning setting and sensor replacement.

The following sensors may be connected by the electronic control system:

Operation sensor	E-COM
RPM sensor	X
Radar sensor [+]	X
Sensor on the flap	X
Sensor on the metering shaft and for detecting the rotors	X
Track marker sensors	X
Sensor on the hopper low level sensor [+]	X
Travel sensor on the disc harrow	X
Travel sensor on the coulter bar	X
Sensor on the hitch for the coulter bar	X

With the exception of the revolution sensor, all other sensors may only be set in the shop.

Brake system

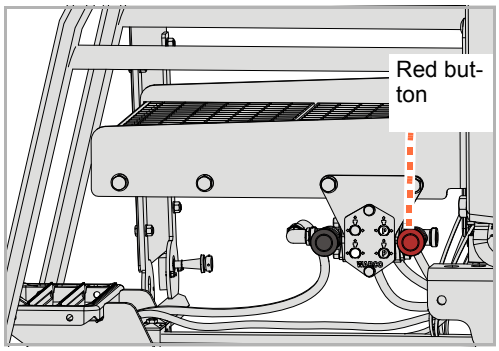
Brake lever

Every 2 years or if required

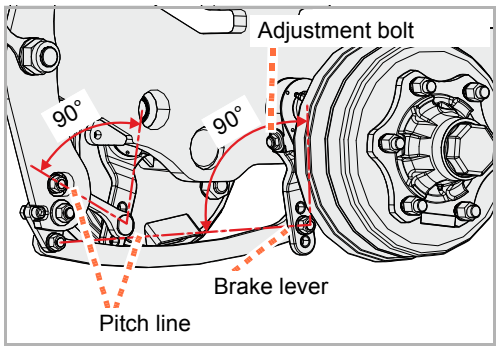
Do not drive on public roads without braking effect
Due to the machine's lack of braking capability, the machine must not be used for road transport when the brake linkage is set incorrectly.
Driving without braking effect may result in accidents.

Since the brake linings wear, you must check the position of the brake lever to the pitch line and, if required, correct it.
Prerequisites:

- The machine is only on the inner transport wheels.



- Press in the red button.



- Remove the wheel.
- Turning the adjustment screw creates a right angle between the brake lever and the pitch line.
- Put the wheel back on the axle and secure it to the specified tightening torque of 350 Nm using nuts.
- Pull out the red button.

Air pressure brake system

- Checking the operating pressures
- Adjusting the brake
- Draining the brake

Checking the operating pressures

Every 2 years or if required

Have the operating pressures of the brake checked in the workshop and set if necessary:

- If braking effect is decreasing
- But at least every 2 years

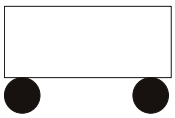
The prerequisites are:

- At least 8 bar in the compressed-air reservoir
- At least 6.5 bar in the brake line (marked yellow)

Machine with low empty weight

Machines with a low empty weight are not fitted with a lock and the braking effect must be adjusted to how full the machine is.

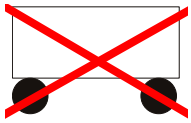
The pressure in the brake cylinders must reach the following values:

Position of the lever	Meaning	Testing pressure [bar]
	Low braking effect	4.7
	High braking effect	6.5

Machine with high empty weight

Machines with a high empty weight are fitted with a lock and the braking effect on these machines does not need to be adjusted.

The pressure in the brake cylinders must reach the following values:

Position of the lever	Meaning	Testing pressure [bar]
	Low braking effect	This position is locked. Manipulating the components to use this position is prohibited.
	High braking effect	6.5



Danger due to brake system not being in working order
If these values are not reached, operation on public roads is not permitted before appropriate adjustment or repairs have been carried out.
If the machine is used on public roads without a working brake system, persons may be injured or killed.

Adjusting the brake

Every 2 years or if required

Have the stroke of the brake piston checked in the workshop and set if necessary:

- If braking effect is decreasing
- But at least every 2 years

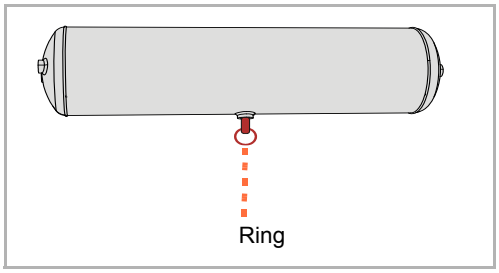
Draining the brake

Once per season or after heavy use

If you place a heavy strain on the brake system, it is necessary to drain the brake's compressed-air reservoir.

- Secure the machine.

→ Chapter »Maintenance«, section »Securing the machine«, page 137

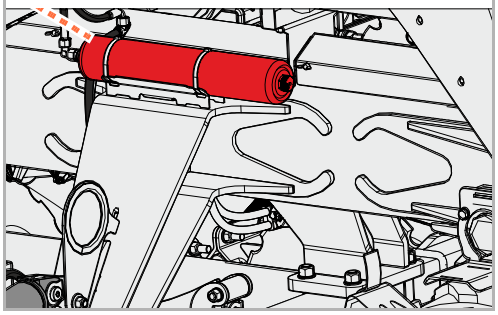


- Pull the ring under the compressed-air reservoir to the front so that air and water escape.
- Release the ring in order to close the compressed-air reservoir again.

Piston accumulator

Every 2 years or if required

Piston accumulator



Have the piston accumulator inspected by trained qualified specialists only and, if required, have them fill it with nitrogen.

Danger caused by incorrect maintenance
Maintenance work must only be carried out on the piston accumulator by trained qualified specialists.
If the piston accumulator is not maintained correctly, persons may be injured or killed.

Risk of explosion caused by using unapproved gases
Fill the piston accumulator on the gas side with nitrogen only.
If the piston accumulator is filled with an unapproved gas, there is a risk of explosion and people may be injured or killed.

Faults can often be eliminated quickly and easily. In the event of hydraulic problems, first check:

- Are the hydraulic hoses properly connected?
- Is the control unit at the tractor defective?
  If so, contact your dealer.
- Is the hydraulic pump of the tractor defective?
  If so, contact your dealer.

Before calling customer service, refer to the table below to check whether you can eliminate the fault yourself.

Terminal

Fault	Cause	Remedy
Terminal does not receive any pulse	Power supply interrupted	Connect the power cable if the power supply was disconnected Check the voltage: The supply voltage must be 12 V
	Fuse defective	Replace fuse
Shut-off valves or the drive motor are not receiving any pulses	Cable defective	Software Check the shut-off valves and the motors in the diagnostics menu. Contact Customer service as required.

Speed sensor

Fault	Cause	Remedy
Speed drops		
• Increasing rpm drop to approximately half-speed • Speed sensor only registering half the actual speed.	Pulse only being provided by one cam	Correct the speed sensor setting → Chapter »Maintenance«, section »Brake system«, page 168
Speed sensor shows no reading	No voltage	Check the electrical wiring and fuses
	No pulse given	Correct the RPM sensor setting
	Sensor defective	Check the RPM sensor and replace it if necessary

Other

Fault	Cause	Remedy
Track marker folds very fast, slowly or not at all	Throttle in the hydraulic line missing	Contact the Customer Service of the dealer
	Throttle in cylinder is contaminated	Contact the Customer Service of the dealer
	Valve is defective	Contact the Customer Service of the dealer
	Valve does not switch	Contact the Customer Service of the dealer
Track marker: • Not folding, or only slowly • Both track marker arms fold at same time	Hydraulic coupling not plugged in correctly	Plug in the hydraulic coupling correctly
	Defective change-over valve	Have the change-over valve replaced by the dealer
	Throttle in cylinder is contaminated	Contact the Customer Service of the dealer
Track marker with electrohydraulic valve block: • Not activating, or only slowly • Both track marker arms fold at same time	No voltage	Check the power supply
	Hydraulic valve (solenoid valve) defective	Have the hydraulic valve (solenoid valve) replaced by the dealer
	Defective change-over valve	Have the change-over valve replaced by the dealer
	Throttle in cylinder is contaminated	Contact the Customer Service of the dealer
Pre-emergence marker does not move	Throttle in the hydraulic line is blocked	Have the throttle cleaned
	Valve is defective or does not switch	Contact the Customer Service of the dealer
Hopper low level sensor always displays a full hopper	Hopper low level sensor does not reach far enough into the hopper	Screw the hopper low level sensor in further

Hydraulics

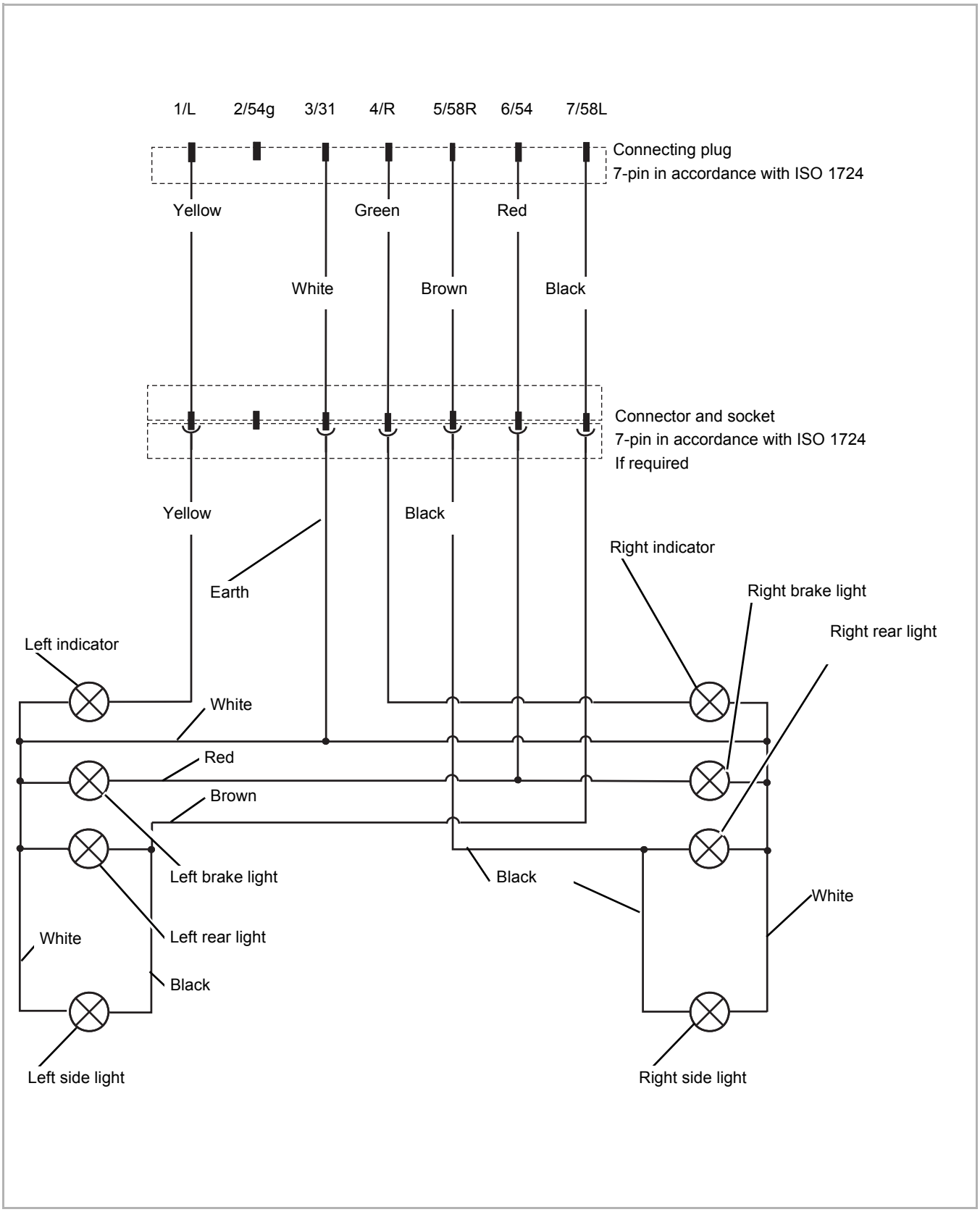
Fault	Cause	Remedy
Return line pressure too high	Too small line diameter, incorrect coupling size or unfavourable return path	Select lines with sufficient line diameters and large return line couplings
	The filter in the tractor's return line is blocked	Contact the Customer Service department of the tractor dealer
Fluid leaking from the hydraulic motor	Worn or reversed shaft seal.	Insert a new shaft seal
The hydraulic motor shaft seal was pressed out	Return line pressure too high	Reduce the return line pressure to a maximum of 10 bar
	Feed and return lines have been switched	Refit lines correctly and connect hydraulic links cleanly
Speed insufficient	Flow control valve is incorrectly set	Check the setting of the flow control valve
	Tractor does not supply enough oil or oil pressure insufficient	• Have hydraulic pump checked • Have the pressure limiting valve checked
Fan does not run at required speed.	Pneumatic lines not completely closed	Completely close the seeding machine's pneumatic system
Hydraulic motor does not run evenly	Control system between the tractor and the machine swings up	Open the flow control valve on the tractor further
Hydraulic motor intermission	Oil reserve on the tractor too low	Have a larger oil tank fitted
	Primary additional control valve was actuated	Select another connection point for the feed line
	Additional control valve was actuated	Do not actuate during work
Valve lever trips out of the catch	Shutdown pressure too low	Check the setting
	Pressure peaks in the feed line	Check the drive capacity of the pneumatic system
	Feed line pressure too high	Have piping fitted by repair specialist
Hydraulic fluid overheating	Insufficient oil reserve in the reservoir: The returning oil is mixed with the low quantity of oil in the tank and thus becomes hot	Have an additional oil cooler fitted
	The control of the pump at the tractor faults because of excessive oil flow in a closed hydraulic system	• Eliminate fault of the pump regulation • Install or refit 3-way flow control valve

Seeding technology

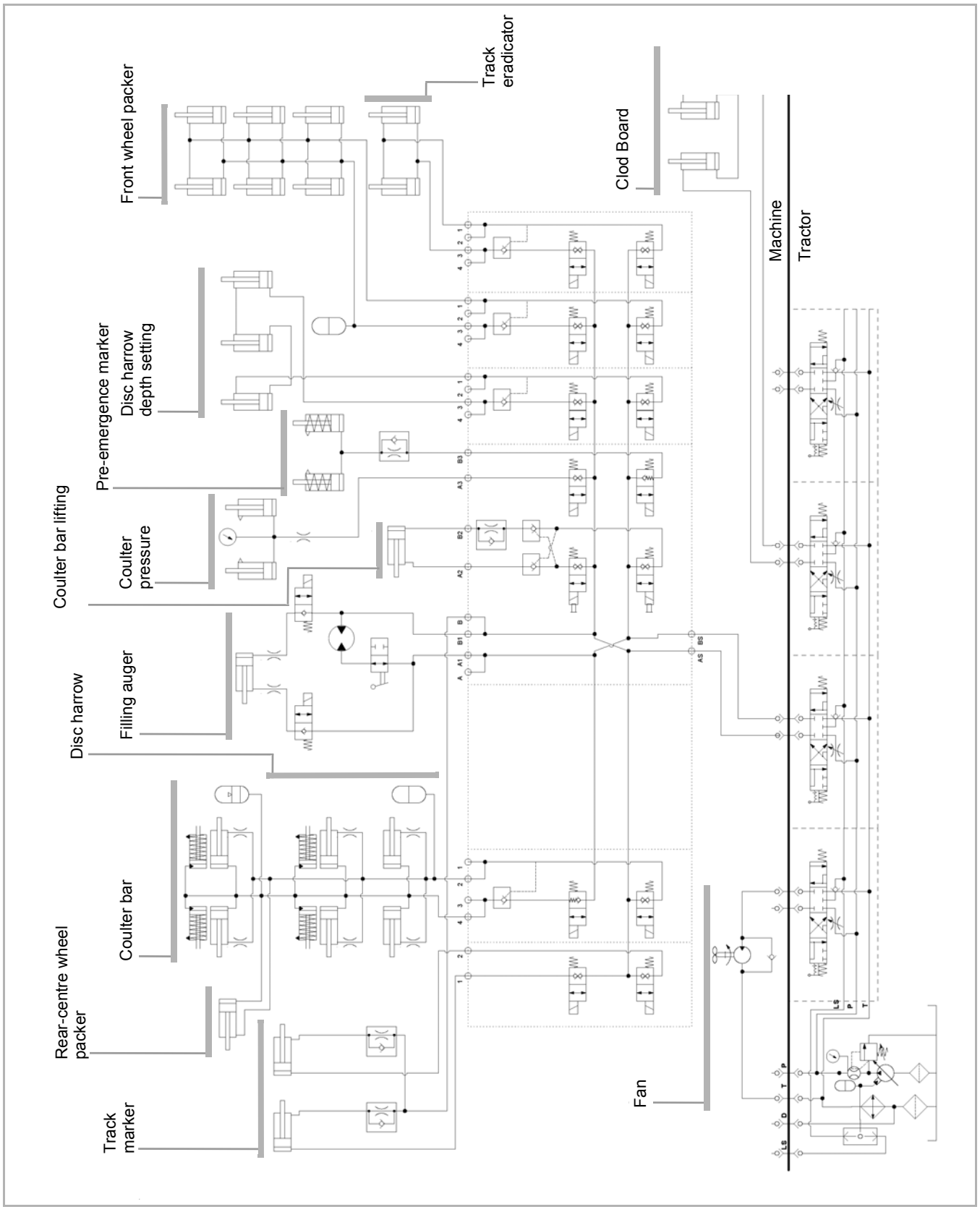
Fault	Cause	Remedy
No tramlines are set up	Insufficient power at socket	Check socket and plug for corrosion
	Defective solenoid switch	Replace the solenoid switch
	Shut-off valve defective	Replace the shut-off valve
Tramline coulter locked when driving	Shut-off valve blocked	Clean the shut-off valve
	Foreign bodies in the main distributor	Remove foreign bodies
Shut-off valve does not move	No power to the shut-off valve	Check cable and connections
	Lever in the shut-off valve defective	Replace the shut-off valve
Distributed seed volume too large or too small	Error when weighing the seed	• Ensure functioning of the scale • Use a sufficiently exact scale, no bathroom scales • Do not take hopper weight into account
	Speed sensor (radar sensor) is not calibrated correctly	Recalibrate the speed sensor (radar sensor)
	Overlaps on the field not taken into consideration	Also take overlaps into consideration
No seed arriving at any coulter	Venturi cone clogged	Remove the clogging and ensure the correct engine speed
	Fan is not switched on	Switch on the fan
	Metering device not powered	Check the metering device's drive
	No speed signal present	Check the speed sensor (radar sensor)
	Seeds with highly adhesive husks block the removable sieve	Temporarily fold the removable sieve to the side

Fault	Cause	Remedy
The discs for the CD mulch seed coulter are blocked	Foreign bodies jammed between the discs	Remove foreign bodies
	Scraper worn	With flat seeding in dry soil, temporarily remove the scraper
		Replacing scraper
Delivery tube is clogged with seed	Coulter could be clogged with soil	Clean clogged coulters
	Hose is twisted, sagging or kinked	Shorten the hoses if required
	Fan speed is too low	Ensure correct fan speed
S-tine harrow working too deep	Pressure too high	Reduce the pressure
	Working depth setting incorrect	Correct the setting
S-tine harrow blocked.	Seed-covering harrow angle too steep	Select different setting

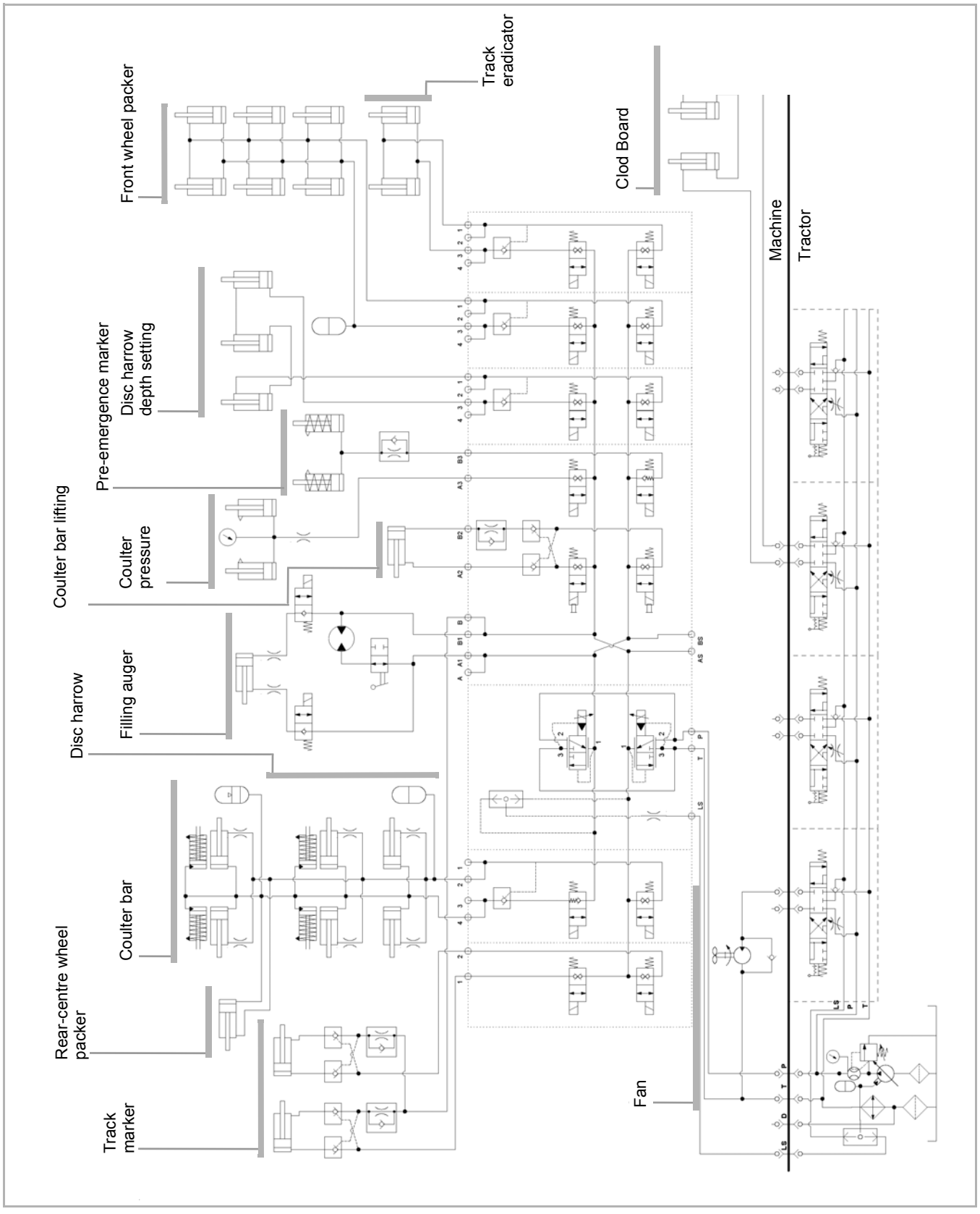
Lighting circuit diagram



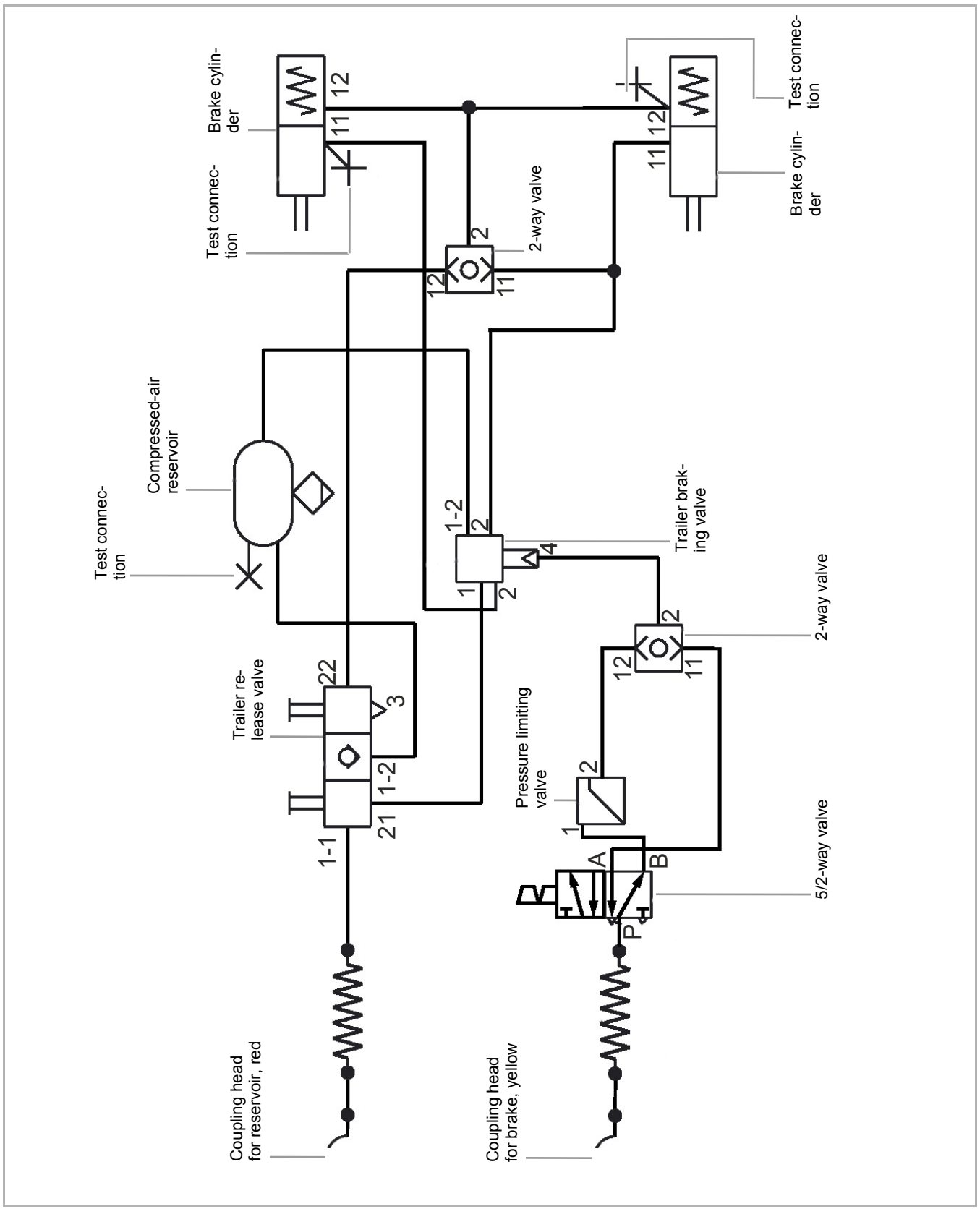
Circuit diagram for the standard hydraulics



Circuit diagram for the LS hydraulics



Air pressure brake system circuit diagram



When the service life of your machine is over, it must be properly disposed of. Observe the currently valid disposal regulations.

Metal parts
All machine components can be sent for scrap metal recycling.

Plastic parts
All plastic parts are marked and can be recycled.

Tyres
Tyres can be sent to tyre recycling facilities.

Oil
Collect fluid from the hydraulic system in a suitable hopper and dispose of it at an old oil collection point.

Electronics
PCBs or terminals are disposed of as electronic waste. If there is no special waste handling facility in your area, you can return the electronic component to the manufacturer for proper disposal. It will then be disposed of in an environmentally-friendly manner.

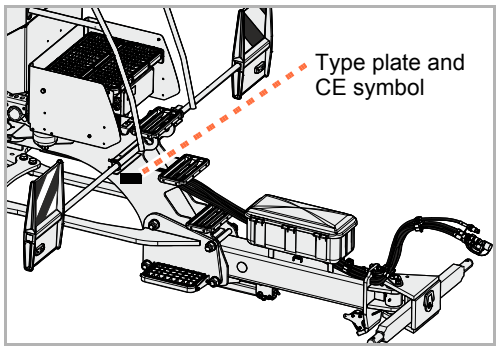
EC Conformity Declaration

Conforms to EC Directive 2006/42/EC

We

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declare with sole responsibility that the product



SC1601CF
in all equipment variants and its accessories

Type: SC1UD2

Valid from machine number:
WK6SC1UD2KD#00122 –

to which this declaration relates, comply with the relevant basic health and safety requirements of EC Directive 2006/42/EC.

To demonstrate our compliance with the health and safety requirements quoted in the EC Directive, we make reference to the following standards:

- EN ISO 12100:2010
- EN ISO 4254-1:2013
- CEN 14018:2010

Kverneland Group Soest GmbH
Soest, 10.04.2019

Hasan Kesek
CEO
and authorised representative*

Copy of the type plate

* person who is responsible for compiling the technical documentation and resides in the European Community. See address above.

A

Adjusting
- Deposit depth 110
- Disc harrow section 53
- Lower link 33
- Metering device 79
- Regulating flap 78
- S-tine harrow 60
- Tools for the soil preparation 51
- Track marker 65

Air pressure brake system 44
- Cancelling the braking effect 46
- Connecting 44

Assemblies 26
Assembly 32, 33, 39

B

Brake system
- Hydraulic brake system 48

C

Care 128
Centre of gravity 15
Changing the seed type 104
Checking brake 96
Checks
- During sowing 120

Cleaning 124
Connecting
- Brake system 34

Connecting brake system 34

D

Disc harrow section
- Maintenance 161

Disposal of the machine 179, 183
Driving on the road 92

E

Employer 5
Emptying
- Metering device 124

F

Faults 173
Features 25

H

Hydraulic brake system 48
- Connecting 48

Hydraulic fan drive 41
- Technical specifications 41

Hydraulic system
- Connecting 36
- Hydraulic fan drive 41
- Operation 43
- Working with the hydraulics 39

I

Instruction 5

M

Machine
- Parking 121, 129
- Storing 133

Maintenance
- Disc harrow section 161
- General information 135
- Maintenance intervals 138
- Safety 134
- S-tine harrow 161
- Transport wheels 152

Maximum fill level 76
Metering device
- Adjusting 79
- Emptying 124

O

Original spare parts 21

P

Parking
- Checking the depth adjustment of the tools 129

Parking the machine 121, 129
Pre-emergence marker
- In transport position 99
- In work position 110

Proper use 24
Protective devices
- Attachment 101, 103

Index

R

Range of application 24
Regulating flap
  Adjusting 78
Road transport, see Driving on the road
Roller tarpaulin
  Removing 105

S

Safety 7
  Agricultural training 11
  Axle loads 15, 17
  Care and maintenance work 21
  Centre of gravity 15
  Checking the screw connections 22
  Coupling 13
  Driving and braking performance 19
  Minimum ballast 15, 17, 77, 95
  Original spare parts 21
  Riding on the machine 9
  Total weight 15
  Tyre load-bearing capacity 15, 17, 77, 95
  Uncoupling 21
  Warning signs 7
  Welding work 22
Scales 90
  Changing the batteries 91
  Settings 91
  Technical specifications 72
Scope of delivery 32
Seed hopper
  Filling 104, 107
Setting the lower link 33
Setting the sowing depth 110
Setting the S-tine harrow 60
Setting the track markers 65
Shut-off valves 67
Sowing
  At half the working width 117
  Working speed 118
Spare parts, see Original spare parts
Step
  Transport position 111
Stickers, see warning signs
S-tine harrow
  Maintenance 161
Storing the machine 133
Symbols 6

T

Target group 5
Technical specifications 28
  General 28
  Others 29
  Seeding technology 29
Test drive 114
Track marker
  Lifting 118
Transport wheels
  Checking the tyre pressure 152
  Maintenance 152
Turning 119

W

Warning signs
  Meaning 9
Weighing system
  Technical specifications 72
Wheel packer
  Checking the tyre pressure 150
Working speed 118
Working zones 27